LOOK FOR **PVP'S** EXCLUSIVE

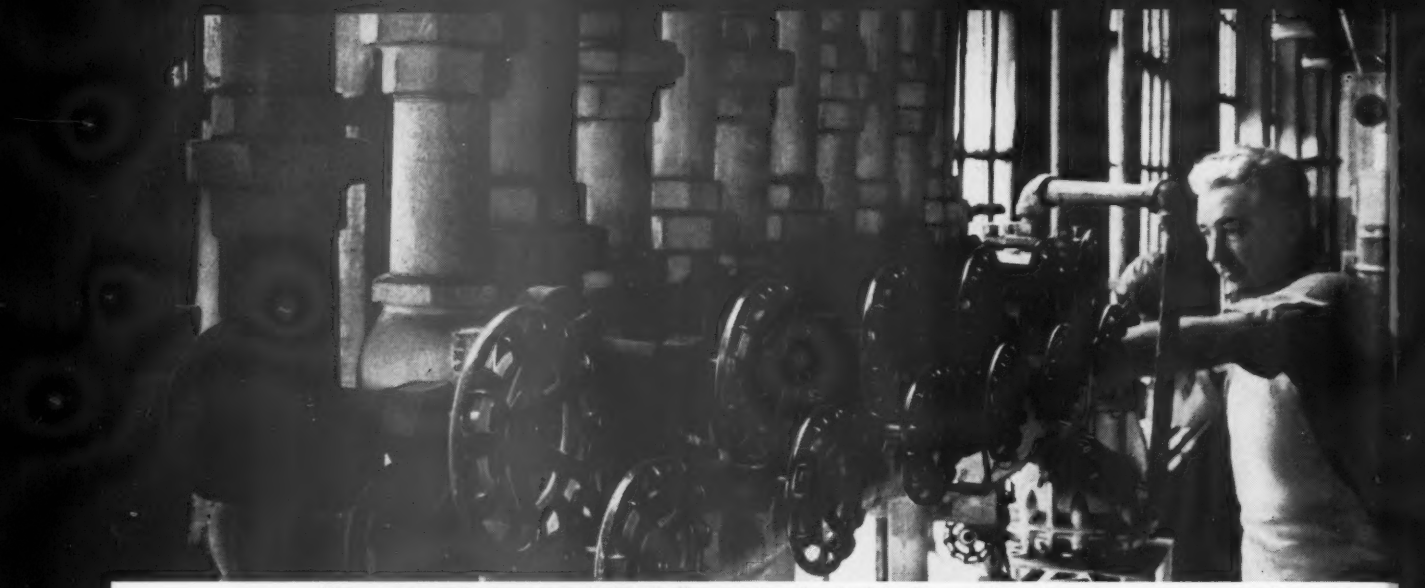
NEW **MANAGEMENT NEWSLETTER**

PAGES 13 & 19

PVP

PAINT AND VARNISH PRODUCTION

Rinshed-Mason's N. P. Beckwith (left), shown with R. L. Pitman, sees auto finishes becoming more complex to meet new designs (p. 57).



Above, a typical solvent manifold. Shell now offers five high boilers and 11 other solvents in economical mixed loads.

SOLVENTS:

Shell Chemical now offers 5 high boilers, 2 medium boilers, 2 low boilers, 4 latent solvents, 2 mutual solvents and 1 unclassifiable, all with mixed load savings

With the addition of three high boiling solvents—methyl amyl acetate and the completely new Pent-Oxone* keto-ether and Pent-Oxol* glycol ether—Shell now offers you a full formulating range with all the bulk price benefits of single-source supply.

Glance through these 16 solvents listed below. See how many you are using currently. If there are any you are not using, perhaps you would like samples of them.

In August, 1960, Shell Chemical introduced Pent-Oxone, a double-action keto-ether high boiling solvent.

At the same time Shell introduced Pent-Oxol, a glycol ether solvent with especial promise as a blush retarding, reasonably quick drying high boiler for nitrocellulose.

Now, to round out the high boiling line, Shell Chemical has added methyl amyl acetate.

5 high boilers

This brings Shell's list of high boilers to five. Pent-Oxone, Pent-Oxol, methyl amyl acetate, ethyl amyl ketone and diacetone alcohol.

2 medium boilers

Shell's major medium boiler scarcely needs an introduction. It's methyl isobutyl ketone.

Shell's second medium boiler is mesityl oxide, an unsaturated ketone with very strong solvent properties.

2 low boilers

Like methyl isobutyl ketone, Shell's two low boilers are industry standards: methyl ethyl ketone and acetone.

4 latent solvents

Shell's four latent solvents are ethyl alcohol, isopropyl alcohol, methyl isobutyl carbinol—an isomeric hexyl alcohol—and secondary butyl alcohol, a solvent for many natural resins, gums and oils.

2 mutual solvents

Hexylene glycol and tertiary butyl alcohol are excellent co-solvents for many immiscible substances.

Unclassifiable

Isopropyl ether is not so easy to put a tag on. It is an extractant for fine chemicals, a solvent for ethyl cellulose, and frequently is used to replace ethyl ether where a solvent of lower volatility is wanted.

Mixed load savings

These 16 solvents are all available in tank cars to drums from any of Shell's nine Industrial Chemical offices. Send for samples. And ask the man from Shell how you can save money through mixed load purchases.

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Title (REG. U.S. PATENT OFFICE)

JULY
1961

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOLUME 51
NO. 8

FEATURES

PRODUCTION

AEROSOL COATINGS

DEPARTMENTS

NEXT ISSUE

Details of modern, electronically controlled resin cooking unit will be featured in the Production section of our August issue.

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PIGMENT TECHNOLOGY AT ITS BEST

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EDITORIAL COMMENT

Improved Wood Coatings Needed

THE survival of wood siding as the preferred construction material is dependent on the development of long lasting wood finishes, ten years or better.

This view was sounded by George H. Weyerhaeuser Company at the recent Spring meeting of the National Lumber Manufacturers Association in New Orleans. Speaking before the joint lumber-coating industry workshop, Mr. Weyerhaeuser setting the tone of the gathering said:

"This meeting has but one objective: We must find a coating that will be appreciably more resistant to some of the virtually unavoidable construction and environmental conditions which have a serious effect on most of the conventional finishes for wood.

"To put it simply," he said, we need a trouble-free, ten year exterior coating for wood siding and, to meet the demands of the public, a satisfactory clear natural finish to bring out wood's inherent beauty."

Pointing to the advantages of wood siding, Mr. Weyerhaeuser asserted that the percentage of homes constructed each year using wood siding is steadily diminishing. The problem of frequent refinishing of exterior surface—a maintenance cost that is a recurring problem—is one of the big reasons for this decline. On the other hand competitors of wood siding have gone all out in promoting the idea of "low maintenance" for their products.

Acting on the findings of the workshops, the establishment of a joint paint-lumber steering committee was approved by the National Lumber Manufacturers Association. This committee will consist of a membership representing a cross section of the two industries, to outline mutual problems of the lumber and paint industries.

A primary target of this joint group is a research program aimed at developing better mill-applied finishes and methods of application. Clear and natural finishes are high on the list. One approach to a breakthrough on a guaranteed ten year finish for wood offered by this group is concerned with prefinishing lumber under controlled factory conditions at the mill.

It is interesting to note that this joint group is giving considerable attention to factory-applied finishes. Spurred by the demands for lower construction and maintenance costs, fabricators of building materials are becoming increasingly aware of the importance of factory-applied finishes with long lasting qualities.

One area where factory-applied paints are being used more and more, is in component parts for prefabricated houses. The exteriors of these prefab houses are usually made of aluminum finished with a vinyl or acrylic coating. Vinyl-coated steel has also been used as well as painted wood siding, masonite and plywood. As prefab homes show a steady growth—approximately 200,000 this year, mounting to 350,000 by 1965—the question whether wood siding will share in this growth lies in the development of a wood finish of high durability.

The challenge is there. The teaming-up of the paint and lumber industries to meet this challenge through cooperative research is a big step in helping wood siding to recapture its share of the building material market lost to competitive products.

PVP
PAINT and VARNISH PRODUCTION

Serving Administration and Technical-Production Management of Coatings Manufacturing Plants

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DICALITE®
TECHNICAL REPORT
DICALITE DEPARTMENT • GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIFORNIA

Dicalite Research Throws New Light on Testing for Gloss and Sheen

Unexpected results obtained during a three-month research project in the Dicalite products laboratory at Walteria, California, may provide an answer to test inconsistencies which have puzzled paint technicians.

This research was undertaken to evaluate fillers and inert pigments as flatting agents, with particular reference to particle size range and distribution.

Formulations were first checked by Hegman gauge to measure the fineness of grind of the inert pigments. Paint films were then drawn down on standard 1/16″ steel test plates for checking with the glossmeter and the flatness gauge.

At this point puzzling inconsistencies began to be apparent.

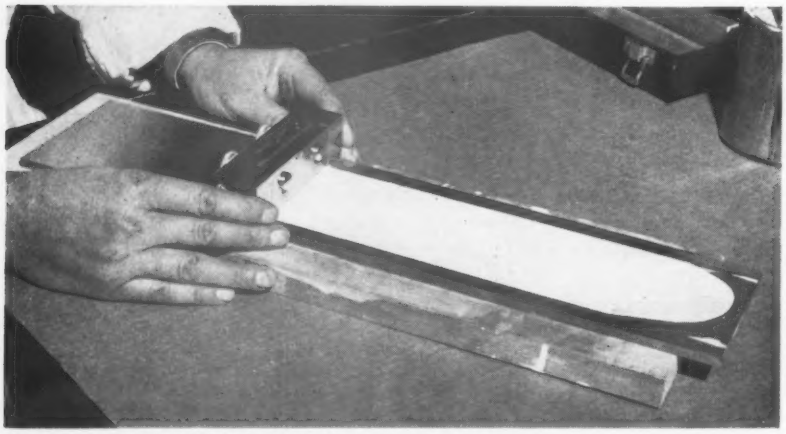
Repeated tests on identical formulations under identical conditions gave variable results. After thoroughly checking all the factors involved, it was discovered that the test plates could not have a sufficiently true surface. Since flatness and gloss are a function of the thickness of the paint film, all other factors being equal, an absolutely true plane surface is essential for accurate and reproducible readings. The problem was solved by the use of special steel plates ¼″ thick, with a machined surface perfectly flat within tolerances less than 0.0005″.

Using these plates, reproducible results were obtained in all succeeding tests. Paint films, 0.003″ and 0.005″ thickness, were drawn down with a Boston-Bradley adjustable blade, and checked for gloss and sheen at 60° and 85° angles. All tests were made without possibility of bias: formulations were blind coded. As a point of interest, all Dicalite materials produced for paint use were found to have Hegman readings in the 3 to 4 range.

It may be stated, on the basis of these tests, that in testing for degree of gloss or sheen, variations from a true plane surface in the test plate (and hence in the thickness of the paint film) will produce wider differences in the readings than will the widest variations in available filler materials and flatting agents.

To the best of our knowledge, no reference to this effect has appeared in trade literature.

The Dicalite products laboratory welcomes comments regarding similar testing procedures.



W. R. SMITTLE

DICALITE'S "MAN ON THE SPOT"

One of the busiest men in the organization is W. R. Smittle, in charge of quality control and customer service work in the Dicalite products laboratory at Walteria, California.

In Smitty's fifteen years with Great Lakes Carbon Corporation he has run or supervised tests or research on everything from antibiotics to zein, including practically every chemical in commercial use. One of his accomplishments was original work leading to the successful filtration of the bacterial excrements known as pyrogens, which many authorities, until then, had claimed were non-filterable.

Smittle obtained his Master's degree at the University of Illinois, after graduation from Kansas State University, and for the eight years prior to joining Great Lakes Carbon was employed in the technical department of Bowman Dairy Company, in Chicago.

The paint research reported in the accompanying columns was conducted under his direction.

NEW DATA SHEETS

contain a summary of these tests for the information of the paint industry. For your copy, write Dicalite Dept., 612 So. Flower St., Los Angeles 17, Calif.

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PVP PAINT and VARNISH PRODUCTION

MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

JULY, 1961

FUTURE CONSTRUCTION contracts signed in May totalled more than $3.5 billion, a rise of five per cent over contracts of May 1960. Construction news specialists point to substantial gains in highways, commercial building, apartments and electric light and power systems as being chiefly responsible for the May upturn. Single-family houses also made important gains in May over the same month last year with a four per cent rise, marking the first time in 17 months that this category exceeded year-earlier levels. Apartment building contracts made a strong showing in May with a gain of 23 per cent. Total residential building contracts signed in May came to more than $1.5 billion, a gain of seven per cent over the same year. Non-residential building contracts in May totalled slightly more than $1.1 billion, a shade below 1960 figures. Gains in contracts for commercial, public, recreational and educational buildings were offset by a sharp decline in contracts for manufacturing buildings in May, but construction experts see hope for a pickup later in the year, based on surveys of plant and equipment spending. Total construction contract figures continued to hold steady in May, as compared to other months in the first half of 1961.

CONSOLIDATION STEPS have been agreed upon by the boards of directors of American-Marietta Co. and The Martin Co. and will be recommended to stockholders at an early date. The understanding contemplates that holders of American-Marietta common stock will receive one share of common stock in the consolidated company for each share of American-Marietta. Holders of The Martin Co. common stock would receive 1.3 shares of the new organization's common stock for each share they presently hold in The Martin Co. It has also been proposed that the present American-Marietta Class B common stock be eliminated, with holders receiving preferred stock in the consolidated company.

GREAT STRIDES along the road to industrial recovery have been reported, although some industries qualify their optimistic outlooks. Chief problem in the chemical industry, according to a Wall Street Journal survey, is over-capacity. Competition, price-cutting and increasing costs also temper an otherwise bright chemical picture. The chemical industry did not lose ground in sales, although growth was at a reduced rate during the recent slump. According to leading chemical producers, February saw the recession's low point with production at 70 per cent of capacity. The industry is now operating between 75 and 80 per cent of capacity, and in most quarters the outlook is for production to hit over 80 per cent by the end of the year. Some in the industry believe that 1961 sales will be close to $29 billion, as compared to $27.7 billion in 1960. Reported sales gains in May were said to be continuing during June.

AUTOMOTIVE FINISHES manufacturers who have been eyeing the growing popularity of compact cars with apprehension may see brighter horizons by 1965. Detroiters won't commit themselves

on a return to larger cars, or what they call "the more-car-per-car market, "but they are cautiously optimistic for more-car-per capita. Chief reasons are a definite trend toward multiple car families, and a huge increase in the 15-to-24 year age group by 1965. Car manufacturers reason that teen agers comprise a growing share of the new driver set, while young marrieds in their early twenties will set up more new households in the coming five-year period. Some manufacturers are even looking beyond our borders to an expanded world market for American cars, and hopefully predict that foreign sales may equal or even exceed domestic sales by the end of the decade.

FACTORY SHIPMENTS of paint, varnish and lacquer totaled $151.7 million in April, according to latest statistics released by the U. S. Bureau of the Census. April shipments were three per cent above those of March, but fell short of shipments in April, 1960 by five per cent. April production of 53.7 million gallons was two per cent below the March figure of 54.7 million gallons. Census figures are unadjusted for seasonal variations and number of working days. Apparently, paint manufacturers worked down factory inventories to some extent during April. This is indicated by the dollar shipment increase of three per cent over March, and the decrease by two per cent of gallons produced.

URETHANE FINISHES, almost unknown in the U. S. five years ago, racked up sales of nearly two million gallons in 1960, according to National Aniline, a leading manufacturer, who expects consumption to more than double by 1963, and more than double again by 1965. Some 300 companies are said to be marketing urethane finishes, more than half of which entered the field in the past year. At present clear wood finishes make up the biggest single outlet. Approximately 700,000 gallons of clear urethane wood finishes are known to have been sold in 1960. Industry sources say that consumption should almost triple by 1963 and more than triple again by 1965. Marine finishes, another major segment of the urethane field, were at a 1960 level of 125,000 gallons, a figure which is expected to jump more than five-fold by 1963, and then double by 1965. Coatings for magnet wire were second only to clear wood finishes in the urethane field in 1960 with a consumption of 500,000 gallons. The magnet wire market is expected to increase by 10 to 20 per cent in the next two years. Approximately 150,000 gallons of urethane paints were used for industrial maintenance applications in 1960. That figure is expected to increase by about 30 per cent by 1963, and then double by 1965.

HOME REMODELING, an activity long submerged by major building concerns, is being upgraded in the plans of many builders. A recent Look Magazine Master Builders Conference revealed increasing interest in the stability and potential growth of the remodeling industry. Most builders expect to run remodeling operations as subsidiaries with separate crews and staffs. Paint manufacturers whose trade sales fluctuate with the ups and downs of the home building industry could benefit by stimulated remodeling activity during the slack periods in new home construction.

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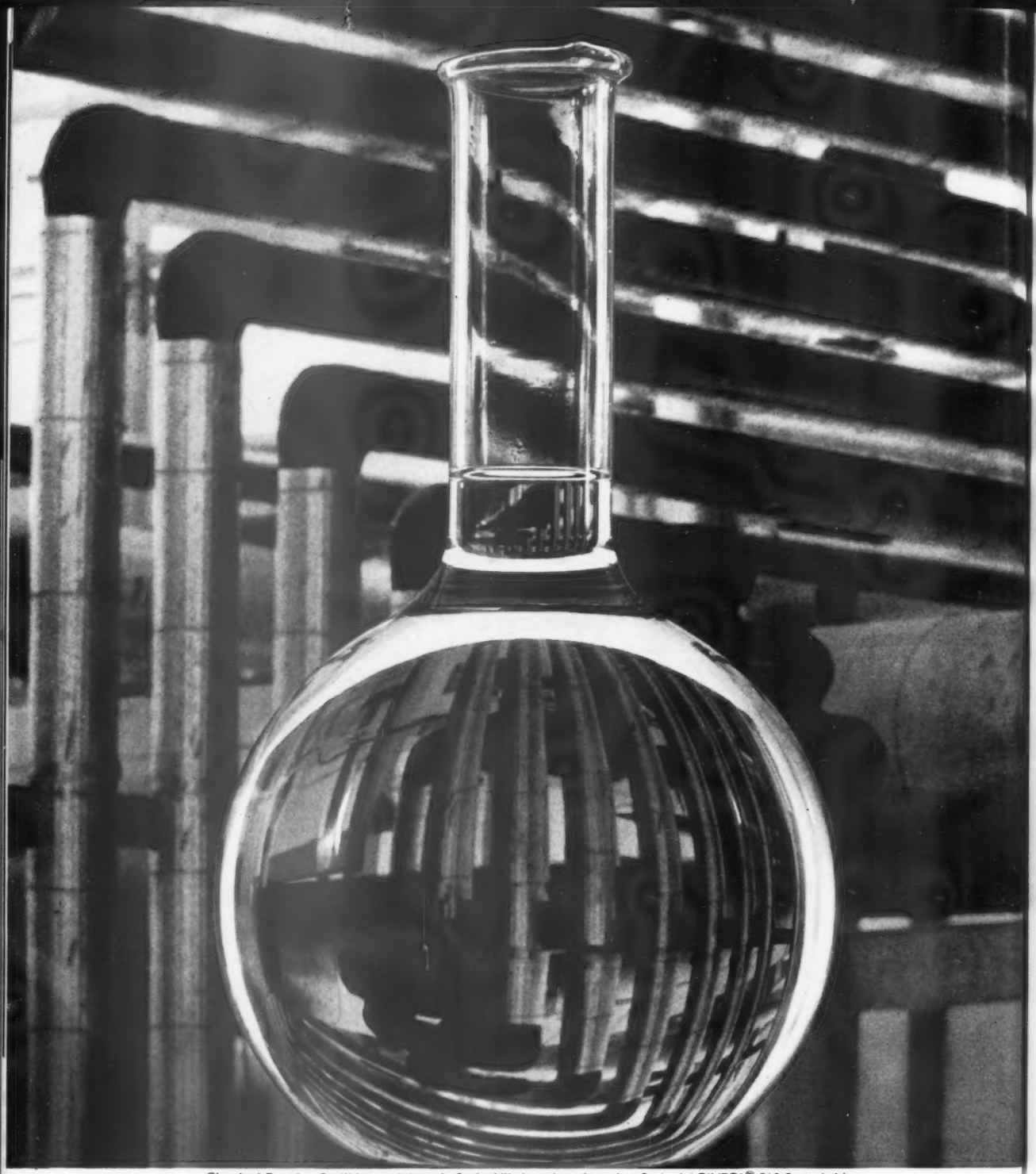

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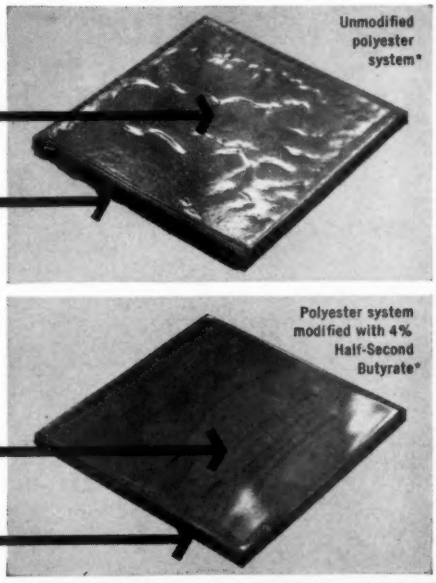

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Of additional interest to finishing material suppliers and their customers is the use of a low-solvent-content Butyrate topcoat lacquer in conjunction with Half-Second Butyrate-modified polyester coatings. This system requires no wax addition to the polyester formulation as a barrier to prevent air inhibition during the cure. And the topcoat lacquer may be applied immediately following application of the modified polyester coating.

For more information about the use of Half-Second Butyrate with polyester finishes, contact your local Eastman representative or write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

* Both panels were spray coated in a vertical position with equal amounts of the polyester finishes described. A Butyrate topcoat lacquer was applied immediately thereafter to prevent air inhibition. Cure time was 30 minutes at 130°F. For test purposes a phthalic-maleic/propylene glycol polyester was used.

HALF SECOND BUTYRATE
an Eastman film-former

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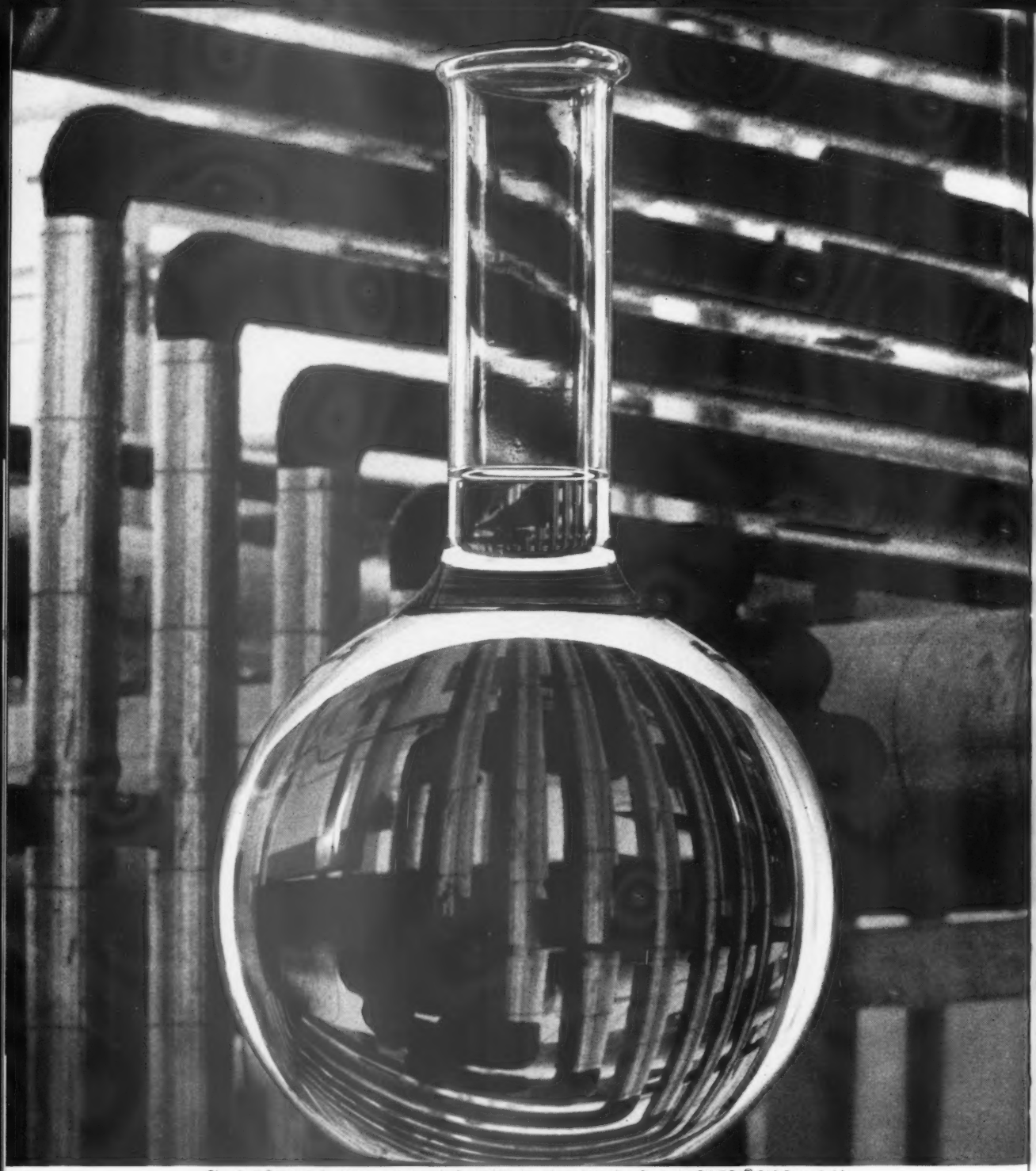

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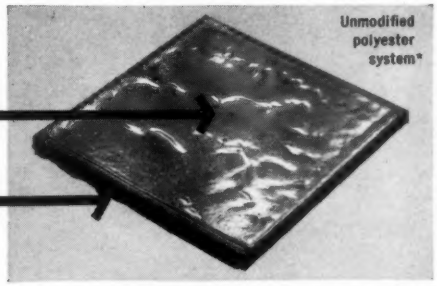

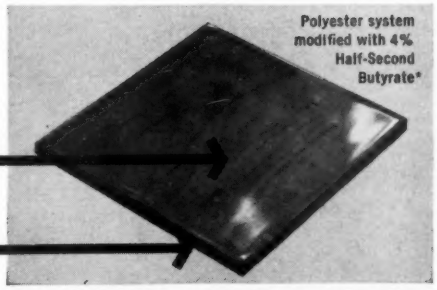

When used in a polyester formulation, Half-Second Butyrate acts as a bodying and flow-control agent. It levels out the resin surface and stops run-off, eliminating time-consuming and costly sanding operations. Yet the outstanding characteristics of the polyester film are not affected, and no changes are required in the method of finish application.

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For more information about the use of Half-Second Butyrate with polyester finishes, contact your local Eastman representative or write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

* Both panels were spray coated in a vertical position with equal amounts of the polyester finishes described. A Butyrate topcoat lacquer was applied immediately thereafter to prevent air inhibition. Cure time was 30 minutes at 130°F. For test purposes a phthalic-maleic/propylene glycol polyester was used.

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MANAGEMENT NEWSLETTER

A MONTHLY REPORT FOR MANAGEMENT OF THE COATINGS INDUSTRY

WASHINGTON REPORT

JULY, 1961

U. S. SMALL BUSINESS Administration has taken on new lif since John E. Horne became the Administrator in February. Tota loans granted each month have soared, compared to the same month in 1960 and previous years.

Mr. Horne is now seeking $150 million in new credit authorizatio from Congress, over and above the huge revolving fund already at hi disposal. He probably will get it, too. President Kennedy himself in his second "state of the union" address, made a strong plea fo SBA credit.

Applications from credit-hungry small businessmen now are pour ing into SBA by the thousands each month. They used to be measure in the hundreds. But the word is out that SBA officials now welcom the opportunity to lend money, rather than discouraging applications The agency has cut its interest rate to four per cent per annum o loans granted to businessmen in economically-depressed areas.

Loans granted to firms in the paint industry totalled $145,500 in on recent 30-day period.

THE FEDERAL TRADE COMMISSION here has been quit active in moving into the paint field, and odds are great that th agency will be more active in the future. The agency has charge State Paint Manufacturing Co. of Tampa, Fla., with using fictitiou pricing, false "free" claims, and other deception to promote the sal of its "State Paints." Respondents were given the usual 30 days i which to file an answer.

The manufacturer of "Mary Carter" paint, also of Tampa, has de nied FTC charges of using deceptive pricing and "free" claims t make sales. The company declares that its advertisements "honestl describe" the value of the paint and that large national-brand pain companies are trying to eliminate it "as a competitor."

The Garland Co. of Cleveland also has denied FTC charges that it sales practices are deceptive and represent unfair methods of com petition. For more than 30 years, the company declares, the res pondents "have sold paint for resale through various sales trade div isions, among which are those set forth in the complaint and tha respondents are well known in the trade generally by and through suc sales trade divisions."

Garland admits it presently uses or has used the following typica names on paint labels to designate the manufacturer, but denies th FTC's charges that they are fictitious or deceptive: Midwest Mfg Co., Bobbi Brite Paint Co., Lewis Paint Co., Van Dyke Paint Co. Windsor Paint Co. and Wonder Paint Co.

The complaint said the brand names for Garland's paint includ Bobbi Brite, Supercote, Van Dyke, Wonderama, Sally Simpson, Lad Ann, Molly Madison, Manor, Estate and Mary Kay. The compan states that it no longer uses some of these.

STANDARD BRANDS Paint Company of Torrance, Calif. ha filed a registration statement with the Securities and Exchange Com mission here seeking registration of 265,000 shares of commo stock, to be offered for public sale through underwriters headed b

Sutro Bros. & Co. and Allen & Company. The public offering price and underwriting terms are to be supplied by amendment.

The registration statement also includes (1) 30,000 common shares issuable upon exercise of employees' stock options; (2) 71,428 common shares into which 5.5 per cent convertible notes and 5.5 per cent escrowed convertible notes are convertible at $21 per share, and (3) 85,000 common shares to be sold to certain individuals at the public offering price less underwriting commissions.

The company is engaged in the manufacture and direct retail distribution through its own stores of paints, enamels, varnishes and allied products in the Southern California area.

THE NEW OMNIBUS HOUSING legislation, called "ominous" by opponents, has cleared both the Senate and the House of Representatives, with only minor changes, and is certain to be signed into law by JFK.

It makes available close to $6 billion for public and private housing, including home improvements and renovations. It is the largest single housing measure ever to pass the Congress and is expected, eventually, to put new life into the home-building industry's tired blood.

Senator A. Willis Robertson (D.-Va.), Chairman of the Senate Committee on Banking and Currency, pleading in vain for his colleagues to reject the measure, declared it was the "worst" bill he had ever seen. Opponents in both the Senate and the House of Representatives attacked it as "back door spending," but to no avail.

The measure makes credit more easily available for virtually everyone interested in buying, building, renovating, or repairing a home. As such, it almost certainly will make it easier for people who are interested in repainting their homes, and will stimulate sales in the paint industry in the coming months.

THE NUMBER OF BUSINESSES in existence in the U. S. at the beginning of 1961 reached a new high of 4.7 million, an increase of about 60,000, or one per cent, over the record set a year earlier, the Office of Business Economics, U. S. Department of Commerce, has announced here. This is a slightly smaller rise than occurred during 1959, reflecting the weakening in economic activity in the second half of '60. There now are appreciably more businessmen than farmers in the United States. Total farm proprietorship runs to about 3.6 million. Owners and managers of businesses now total more than 7.5 million, which is appreciably greater than the total of persons owning, managing and operating the farms of the nation.

This explains why Congressmen, once so sensitive to the needs of the farmers, now are becoming increasingly aware of the "needs" of business, and more particularly the nation's "small businessmen," who make up 95 per cent of the business community.

Some 440 thousand new businesses were established in '60. At the same time, companies which either discontinued or were forced out of business by the exigencies of life total 385,000.

With the exception of manufacturing, all the major segments shared in the business population increase. The number of manufacturing companies in operation has shown little change in the past several years.

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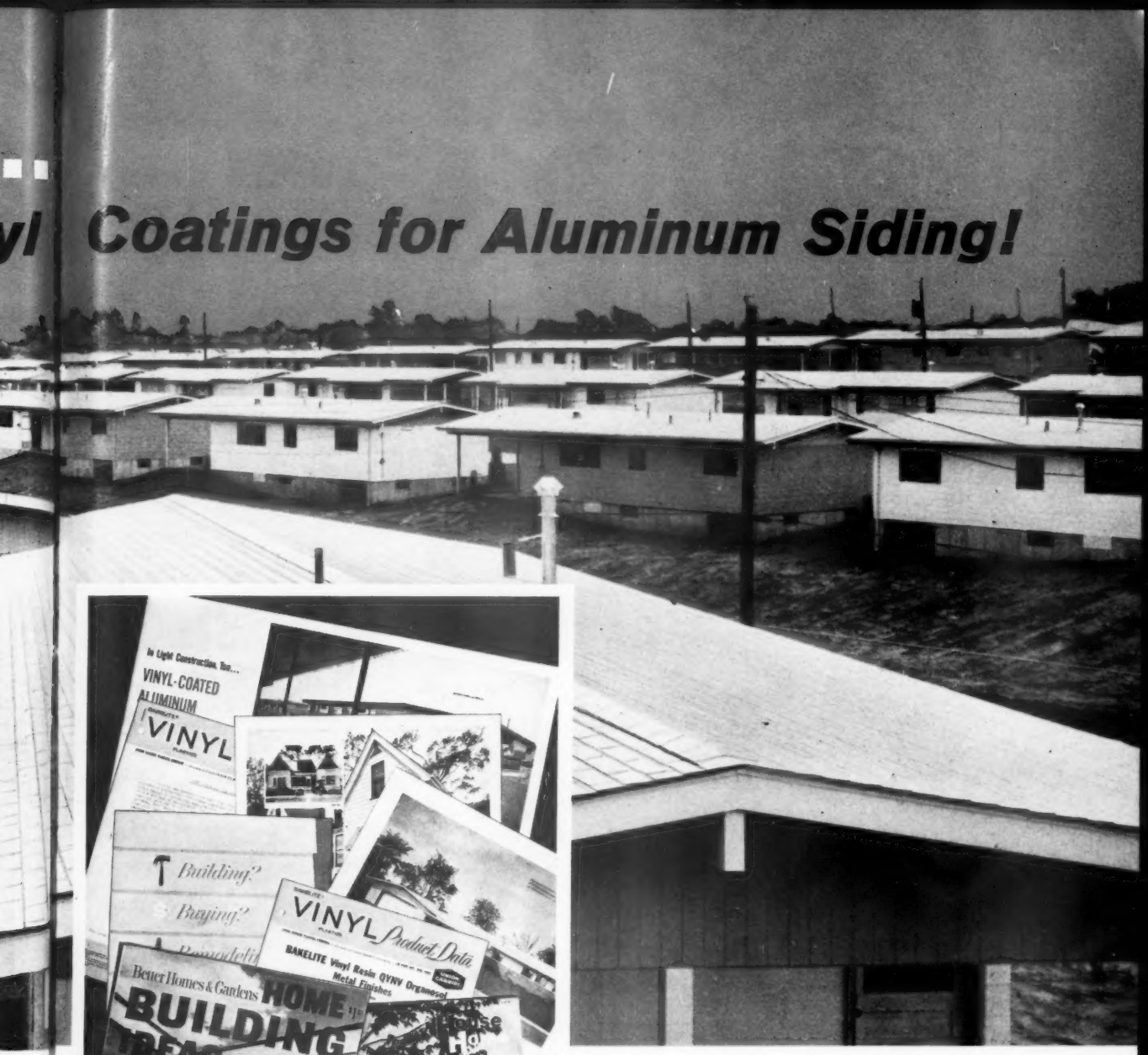
yl Coatings for Aluminum Siding!



3 EFFECTIVE PROMOTION BEHIND IT. To help you sell more vinyl coatings for aluminum, Union Carbide Plastics Company is telling the vinyl story to homeowners through ads in *Better Homes & Gardens 1961 Home Improvement Idea Book* and *1961 New Homes Idea Book,* to builders through *House & Home,* to building supply dealers through *Building Supply News,* to home improvement dealers through *Building Specialties,* and to coaters and siding manufacturers through *Modern Metals.* For more information, write Dept. HZ 103G, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada:* Union Carbide Canada Limited, Toronto 12.

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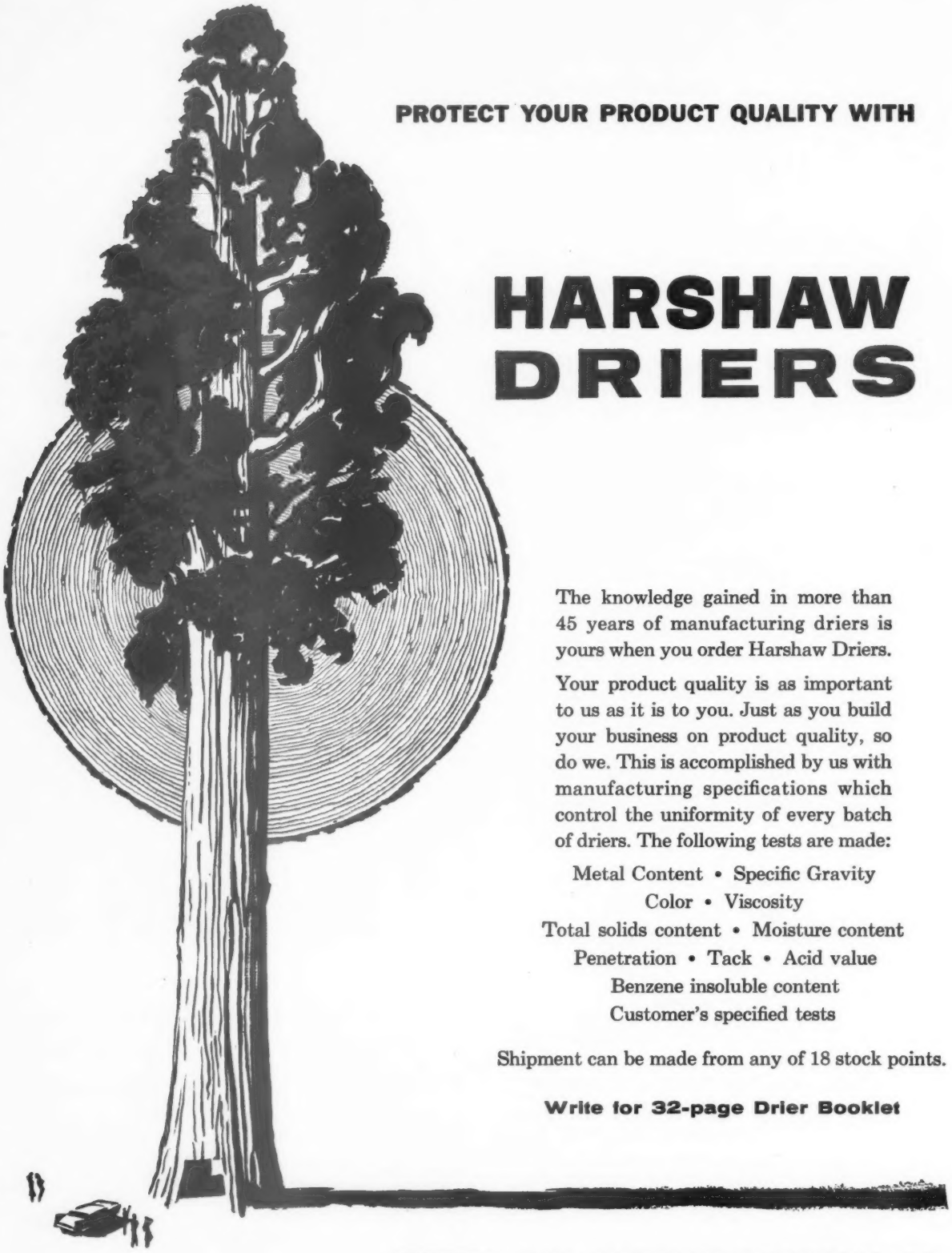

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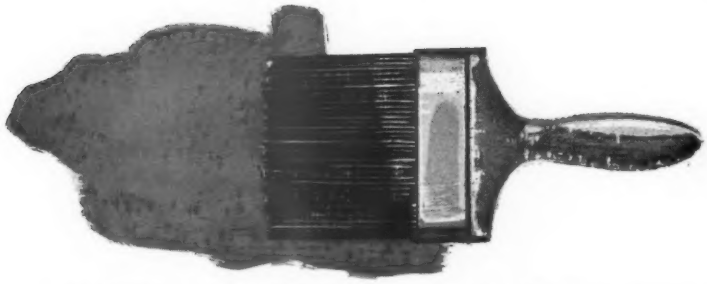

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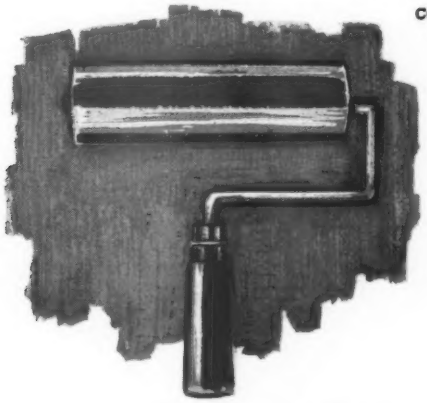

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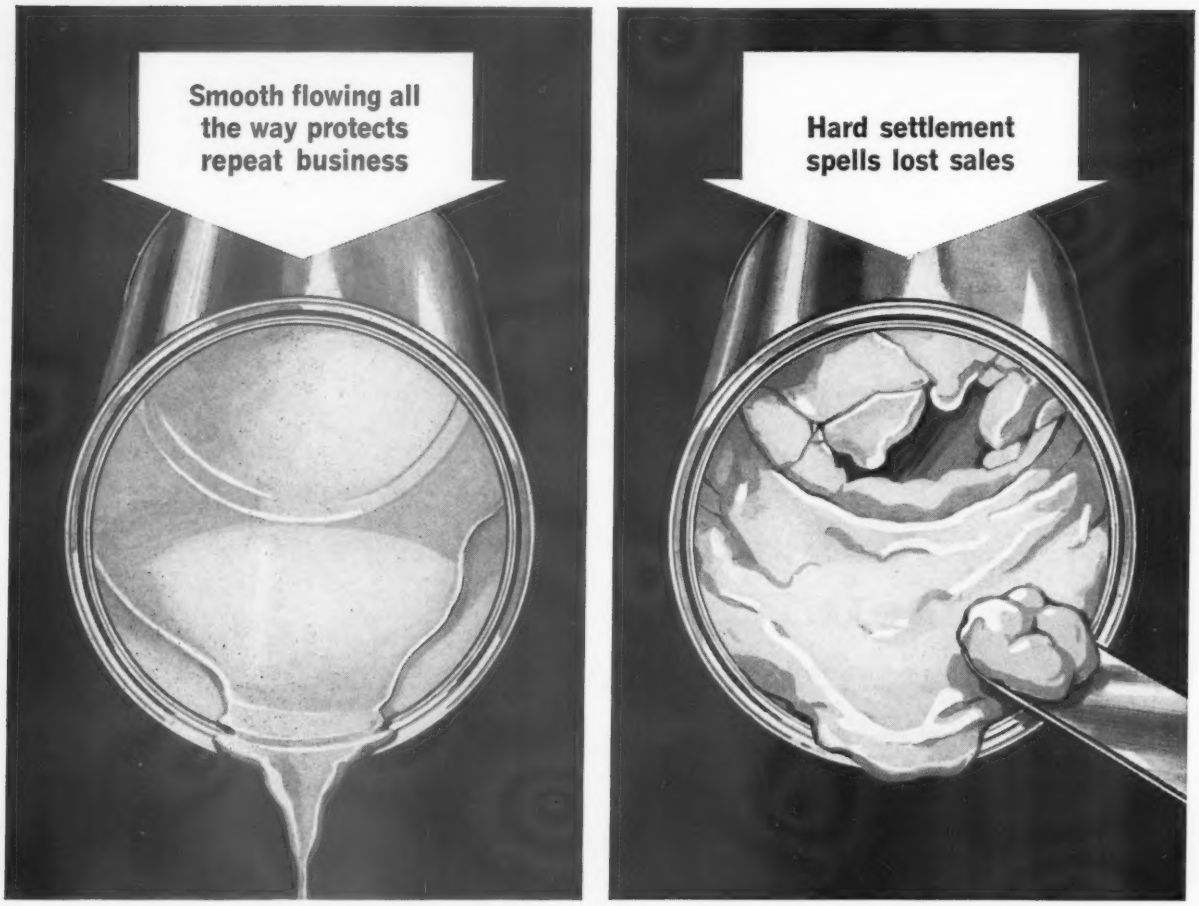

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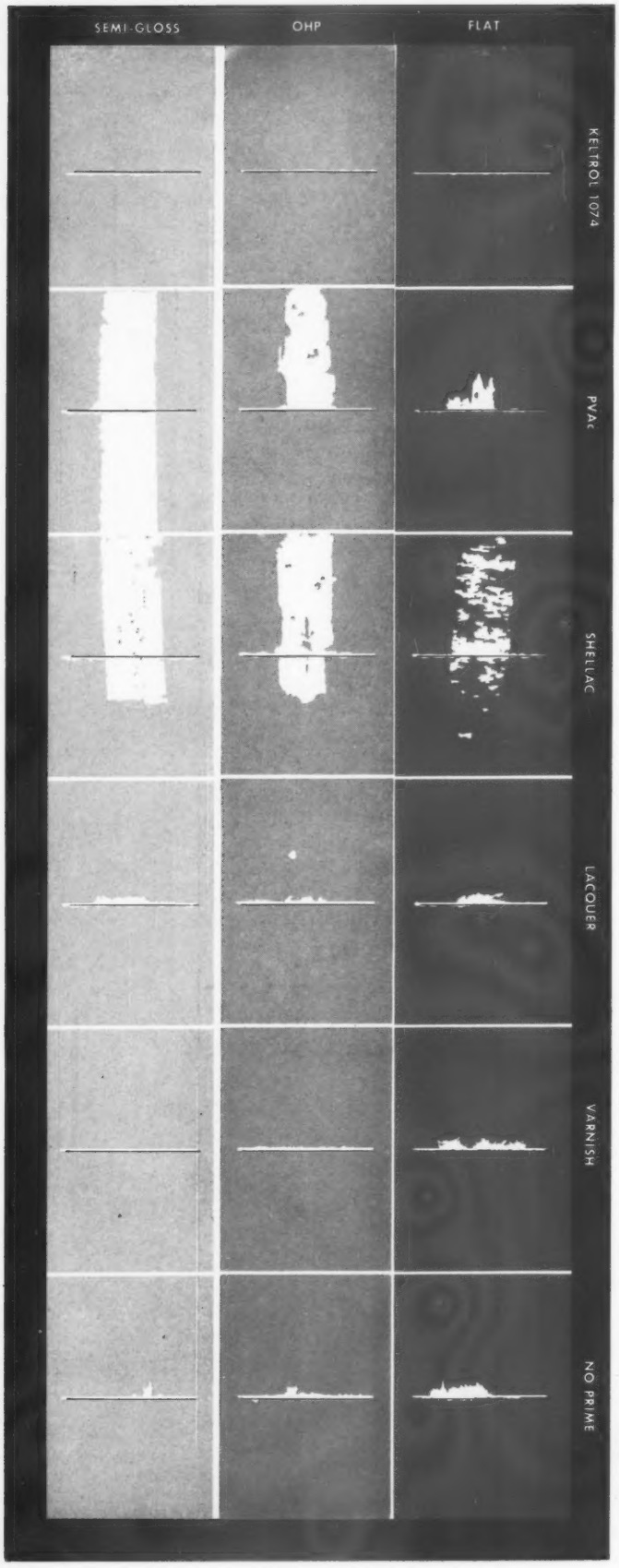

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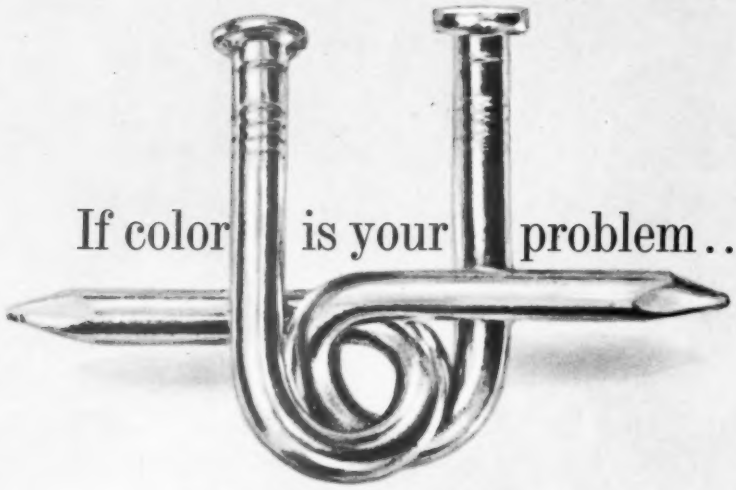

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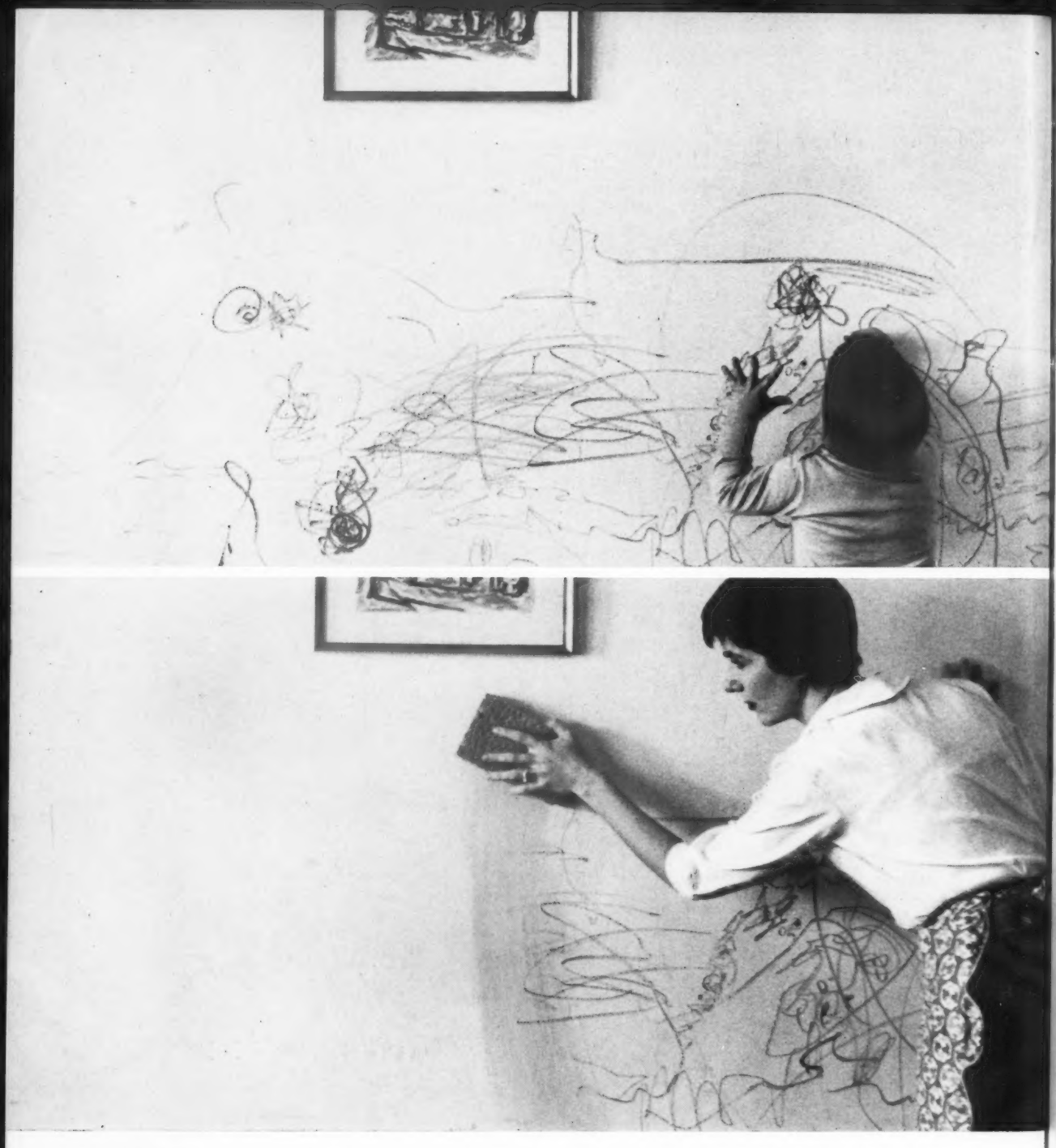

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BASIC TO AMERICA'S PROGRESS

BLISTERING OF PAINTED STEEL

Part I

Film deterioration of coated panels is traced to the formation of hydrogen developed during corrosion of the bare metal surface.

By
J. A. W. Van Laar*

A completely paint coated steel panel, immersed in fresh aerated water, develops blisters. If on one side of the panel part of the metal is laid or left bare and subsequently corrodes, then on the opposite side of those bare spots few or no blisters develop, whereas in the blisterless regions corrosion appears under the film.

This phenomenon is called the Dia Phenomenon. It has been proved that both blister suppression and corrosion stimulation are attributed to the action of atomic hydrogen, generated by the corrosion at the bare spots, then diffusing right across the metal to the so-called Dia side, causing there a lack of oxygen and therefore corrosion by differential aeration.

The Dia Phenomenon is influenced by pretreatment, and by the kind of paint used. An interlayer of copper in the steel panel makes it disappear, an interlayer of chromium steel does not. It can be produced, instead of by corrosion, by electrolysis at the bare spots too.

Potential measurements and gas analysis at the Dia side have been carried out. All these experiments substantiate the atomic hydrogen conception. Conclusions have been drawn for theory and practice of painted steel behaviour.

THE phenomena dealt with in this investigation have been observed with painted or lacquered steel.

One of the tests employed is to subject similarly coated steel to the so-called *Fresh Water Immersion Test.* In the course of this test on a coated steel panel immersed in fresh water, blisters filled with water develop under the coating but the metal surface remains free from rust. However, if on one side of the panel part of the metal surface is laid bare, either by scratching through the coating or by masking part of the surface before applying the paint, and allowed to corrode, we find that, on the opposite side—called the Dia side—the regions congruent with above-mentioned scratches or bare spots contain fewer blisters than the rest of the Dia-side or even no blisters at all, whereas in these blisterless regions corrosion appears or is stimulated. This phenomenon we call *the Dia-Phenomenon*

In the course of this exposition we hope to be able to demonstrate that the above-described suppression of blister formation accompanied by the stimulation of corrosion is due to the presence of atomic hydrogen which forms at the spot left unpainted or laid bare by a scratch and diffuses through the steel to the opposite side. Thus blister suppression and corrosion stimulation could be attributable to one and the same cause. In order to verify this hypothesis the samples used in the Fresh Water Immersion Test are varied. With one kind of sample a rust-test is carried out. In addition several other experiments are made. This can be summarized as follows.

*N. V. Philips' Gloeilampenfabriken, Eindhoven, Netherlands.
For complete details on figures and illustrations, see page 88.

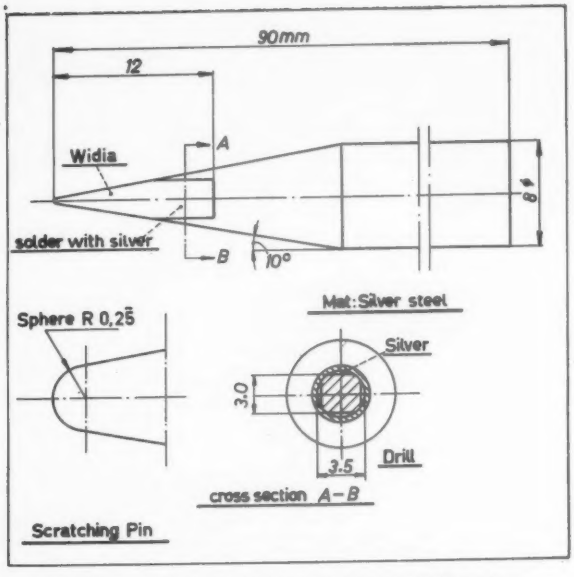

Figure 1. Schematic diagram of scratching pin.

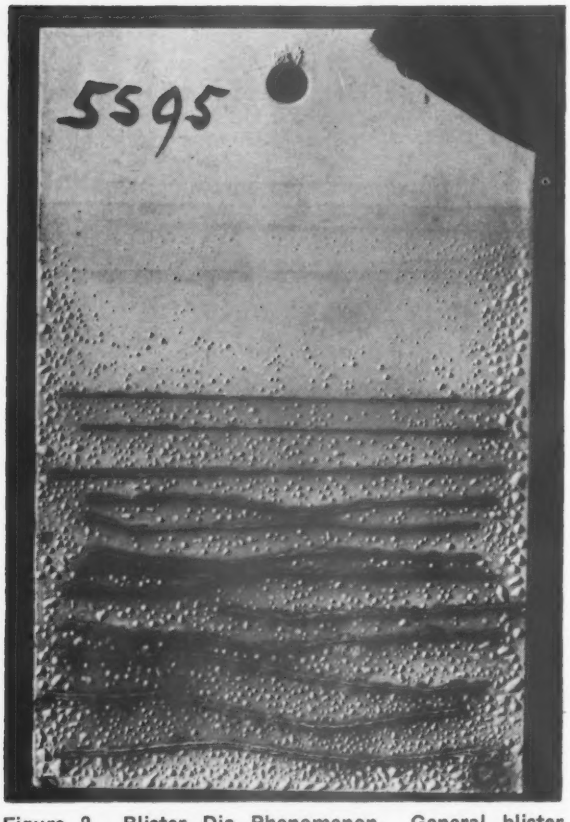

Figure 2. Blister Dia Phenomenon. General blister formation occurs between the scratches and edges of the panel. In the immediate vicinity of the scratches, little or no blistering occurs.

The conditions are varied in the above-mentioned experiment, in which bare spots on a partly painted steel panel corrode resulting in certain changes on the back of the panel.

Different pretreatments and paint systems are applied. In addition, the permeability of the steel panel for atomic hydrogen is influenced by sandwiching the steel sheet with an interlayer of copper or chromium steel, while also the thickness of the steel is varied.

Promotion of the initial corrosion has been obtained under two different circumstances. The results are in accordance with the assumptions made.

Electrolysis: To confirm the atomic hydrogen hypothesis, a steel panel with spots left unpainted is made the anode or cathode in an electrolysis process instead of being subjected to the influence of corrosion. At those spots where atomic hydrogen can be expected to develop, the Dia phenomenon occurs and vice versa.

It will be proved once more that the rusting steel panel takes up atomic hydrogen, that may emerge and can be identified as such at the opposite side; all of which is influenced by the paint film and by applying an E.M.F. to the steel.

The electric potential of the liquid contacting the steel on the Dia side has been found to be more positive if the steel is not coated on the back of the panel.

Discussion of results conclusions. After the results are discussed, explained and compared with those of other authors, an attempt is made to evaluate their value for theory and practicality.

The Dia Phenomenon in the Fresh Water Immersion Test

Methods of Investigation

We shall first discuss the tests used as well as the various kinds of samples.

The Scratch Test

To one side of a painted panel, scratches are applied with the aid of a specially devised pin, shown in fig. 1. The pin has

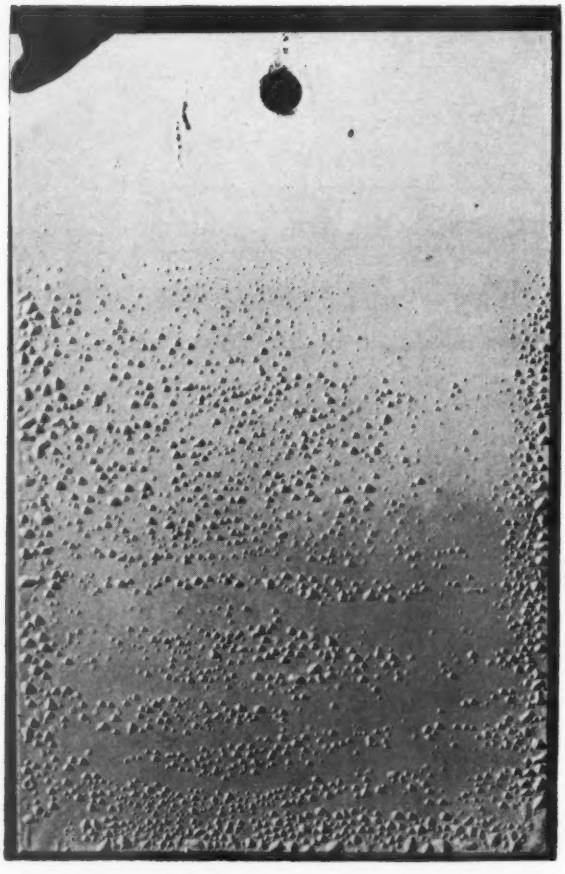

Figure 3. Blistering Dia Phenomenon. On the Dia side, no blistering occurs before 30 days. Larger blisters take place along the scratches where originally there was little or no blistering.

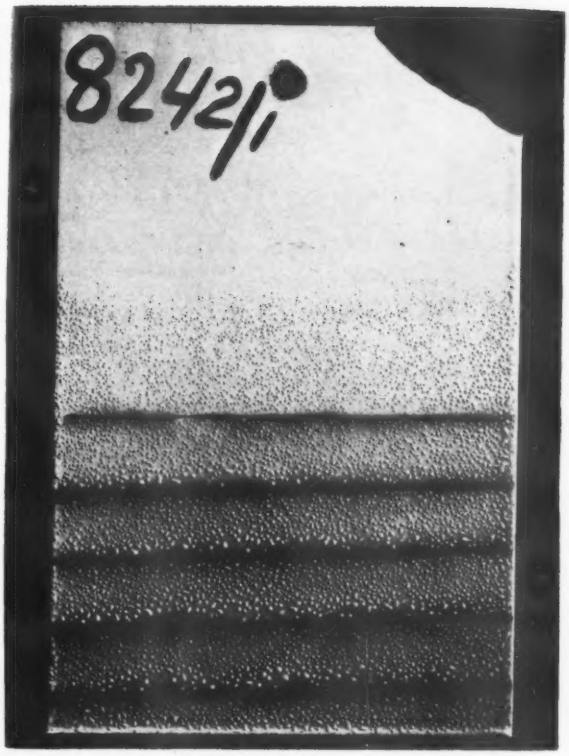

Figure 4. The Blister Dia Phenomenon. General blistering pattern ("5" of Table I) In the immediate vicinity of the scratches, there is little or no blister formation.

Figure 5. The Blister Dia Phenomenon. No blistering takes place within the scratched area of the Dia side, after 7 days of immersion; after 37 days this blister pattern becomes less pronounced.

the shape of a pencil, the point is made of Widia and is hemispherical with a diameter of 0.5 mm.

Purpose of the scratching is not to test the scratch-proofness of the paint-system but to simulate and standardize any damage encountered in practice laying bare the metal.

To obtain complete penetration of the paint coating a pressure of about 2 kg for an aluminium and of 4 kg for a steel substrate has to be exerted on the scratching pin. The pin is to be held at an angle of 84 degrees with the plane of the panel. Drawing the pin across the surface is done along a ruler or by means of a mechanical device. Speed of drawing is 10 cm/sec. After scratching, the metal should show a slight deformation at the spot of completely removed. The panel has a rectangular shape. The panel when exposed is always placed vertically on its smaller bottom side. The first scratch is drawn parallel to this side. The next scratch is drawn a little higher and parallel to the first scratch and so on. This test is used here to induce corrosion but it may equally serve to record any decreases of adherence for instance in a roof test.

The latter subject will be more fully treated in a paper by the same author shortly to appear in the "Deutsche Farben Zeitschrift".[1]

The Fresh Water Immersion Test

A painted steel panel is suspended vertically for three quarters of its surface immersed in pure distilled water of 40°C. Air is bubbled through the water. The array for suspending the panel is exclusively made of glass. The effect of this test generally consists of the development of blisters, not of underrust. The blisters are evaluated as to their size, shape and distribution according to a number system, ranging from 10 (no blisters) to 1 (completely blistered). Each number represents a range of percentages of surface occupied by blisters. From this the average distance between the centers of two adjacent blisters divided by their diameter has been calculated and is given in Table 1 for the sake of illustration. In practice evaluation is done visually.

Rust Test No. I[1]

The sample is suspended over a saturated KCl solution in a closed glass container. The relative humidity is consequently 85%. 1% of acetic acid has been added to the solution for stimulation of corrosion. The container is placed in an oven at 40°C. This test initiates the development of underrust, starting at the unpainted parts of the panel.

The Painted Steel Samples

The base metal is cold-rolled steel, the panel size 0.1 x 9 x 14cm. Mild (always wet) and heavy sandblasting and shotblasting (medium grade) are applied and roughnesses of successively about 100, 200 and 300 ru (B.S. 1134) are obtained.

Trichloroethylene vapour degreasing is carried out in an I.C.I. laboratory apparatus.

The paint system mostly used consists of two coats of baking paints: a dehydrated castor oil alkyd primer with TiO_2 anatase (15-20μ) and a plasticized urea resin topcoat with TiO_2 rutile (30-40μ.) This system will be referred to as the Standard Paint System.

Combinations of Aethoxylin resin with urea resin or with castor oil fatty acids, and of castor alkyd with nitrocellulose are also used.

The Dia Phenomenon with the Standard Paint System

After a discussion of a typical example, several variations of pretreatment of the substrate, pattern and thickness of film, structure and thermal treatment of the steel panel will be dealt with.

Dia Phenomenon of the Standard Paint System on Cold-Rolled Steel, Mildly (wet) Sandblasted.

The Dia Phenomenon can be subdivided into the Blister Dia Phenomenon and the Corrosion Dia Phenomenon, which can be shown to be correlated.

Figure 6a. An example of the Blister and Corrosion Dia Phenomenon is shown in the above photo.

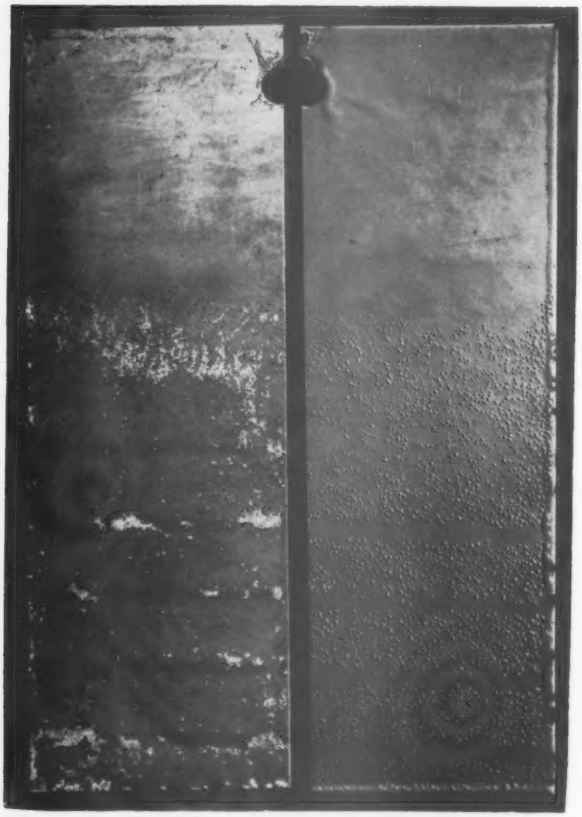

Figure 6b. The Blister and Corrosion Dia Phenomenon. In the area where no blistering develops, a dark discoloration is produced on the metal.

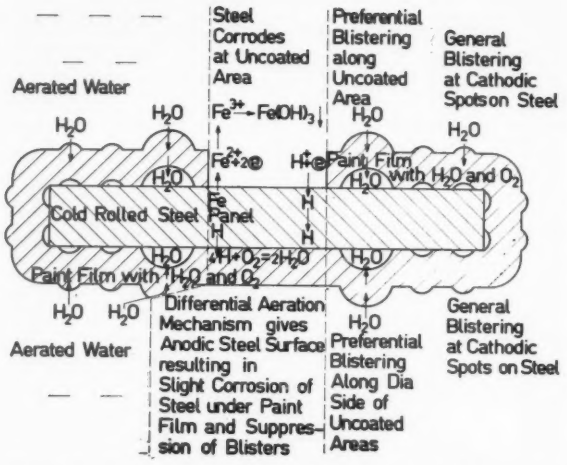

Figure 7. Schematic diagram of the Blister and Corrosion Dia Phenomenon.

The Blister Dia Phenomenon

Fig. 2 and 3 show a typical example. This is the very first panel with which the Dia Phenomenon was observed. For details we should like to refer to the captions of the figures. We see blisters on the scratched side as well as on what we call the *Dia side* i.e. the non-scratched side of the panel as far as panel is immersed.

At the Dia side of the scratches however, no blistering occurs, at least not for the first eight scratches and less clear for the ninth scratch. This suppression of blisters is the Blister Dia Phenomenon. When scratches No. 10-12 are made, blistering is already too strong to give the Blister Dia Phenomenon, i.e. after 37 days and more. The geometrical coincidence of scratches and blisters can be demonstrated by tracing the panel and the scratches on a translucent, not too slack piece of paper, reversing it and placing it on the Dia picture. The blisters are slightly larger along the scratches and their Dia sides and along the edges. This will be shown more clearly in figures where blister development is in an earlier stage.

The Corrosion Dia Phenomenon.

Figs. 4 and 5 again show the Dia Phenomenon. This panel was cut in two, and one half was stripped of its coating with the aid of a suitable solvent mixture. Figs. 6a and 6b show the result.

We see black spots where the blisters were previously, at the front as well as at the back of the panel.

Table 1. Evaluation of blisters, formed in the Fresh Water Immersion Test

Relatively blistered Surface Range	mm^2 blistered Surface range for panel 9 x 14 cm	Mean Distance of Blister Centres divided by Blister Diam.	Evaluation Number
0 %	0	∞	9
0–0.1 "	0– 10	∞–30	8
0.1–0.3 "	10– 30	30–20	7
0.3– 1 "	30– 100	20–10	6
1– 3 "	100– 300	10–6	5
3– 10 "	300– 1000	6–3	4
10– 30 "	1000– 3000	3–1.8	3
30– 60 "	3000– 6000	1.8–1.3	2
60– 80 "	6000– 8000	1.3–1.1	1
80–100 "	8000–10000	1.1–1.0	0

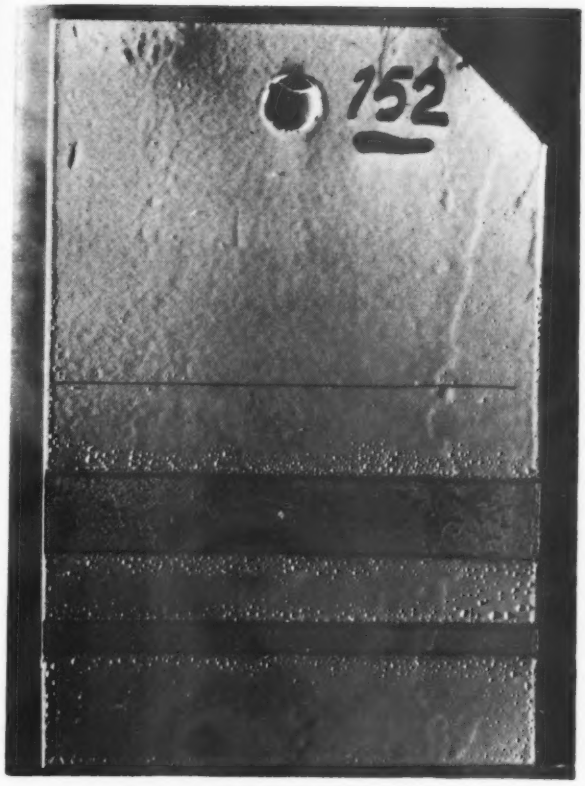

Figure 8a. The Blister Dia Phenomenon on hot-rolled "sandwiched" panels. Blister formation is more pronounced along masked (bare) areas than scratches and panel edges.

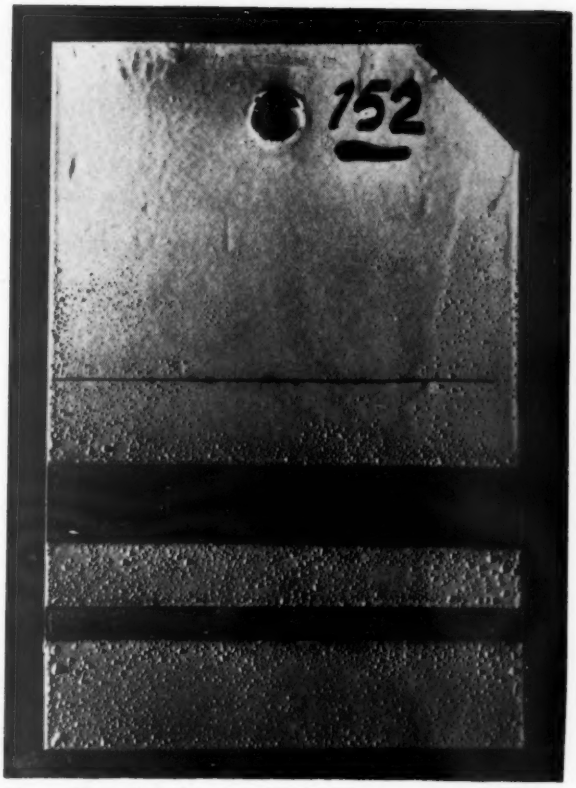

Figure 8b. After 41 days of fresh water immersion, blistering is more general than the panel shown in Fig. 8a.

Tests on lacquers will show that this blackness is due to some oxidized-iron compound, formed after the sample has been taken out of the test with the water still present in the blister.

At the Dia spot of the scratches, however, we see a dark discoloration of the metal, black with a brownish tinge, less dark than underneath the blisters of which only a few are present in this region. Their discoloration are in marked contrast with the Dia discoloration.

The streaks are as wide as the unblistered areas, i.e. 2-3 mm. This is the Corrosion Dia Phenomenon.

It seems that the Dia phenomenon of blistering and corrosion coincide more or less; therefore it is concluded that they either have a common cause or are interconnected. Thus, an explanation may be given for the fact that, (as will be shown later)., although the blistering speed in general on vapour-degreased and on mildly sand blasted steel are of the same order of magnitude, only with the latter does the Dia Phenomenon occurs. Apparently there is a link between a certain amount of corrosion under the paint film and a suppression of blisters.

In the case of the sand blasted steel the more active metal surface will respond more promptly to the corrosion stimulus through the metal than when the metal surface is degreased with trichloroethylene only. Fig. 7 is a schematic diagram of the Dia Phenomena.

Dependence of the Dia Phenomenon upon Pretreatment of the Substrate and upon the Method of Applying the Film.

Considering painted steel in general, one may ask, in which case does the Dia Phenomenon occurs and in which case it does not.

Figure 9. The Blister Dia Phenomenon on a hot rolled "sandwiched" steel panel. Blistering is considerably diminished in masked (bare) areas of Dia side (Fig. 8b.)

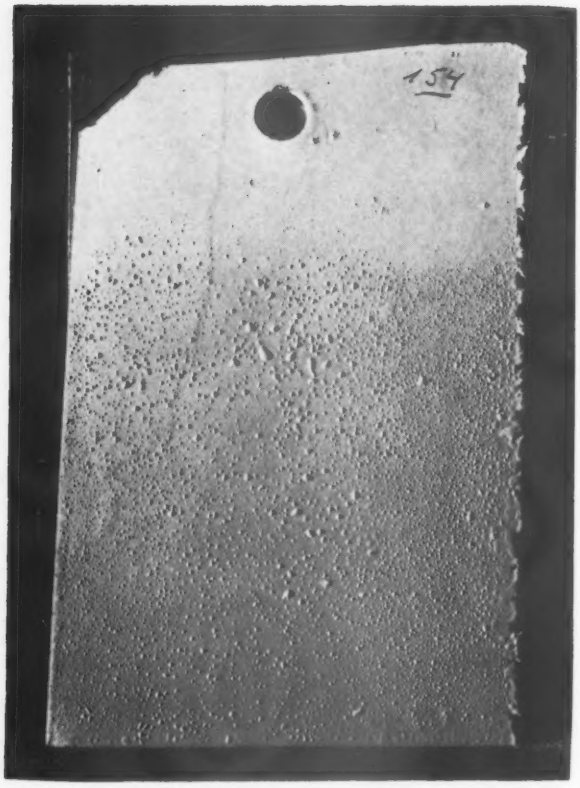

Figure 10. The Dia Phenomenon does not occur on a hot-rolled "sandwiched" steel panel with a copper interlayer.

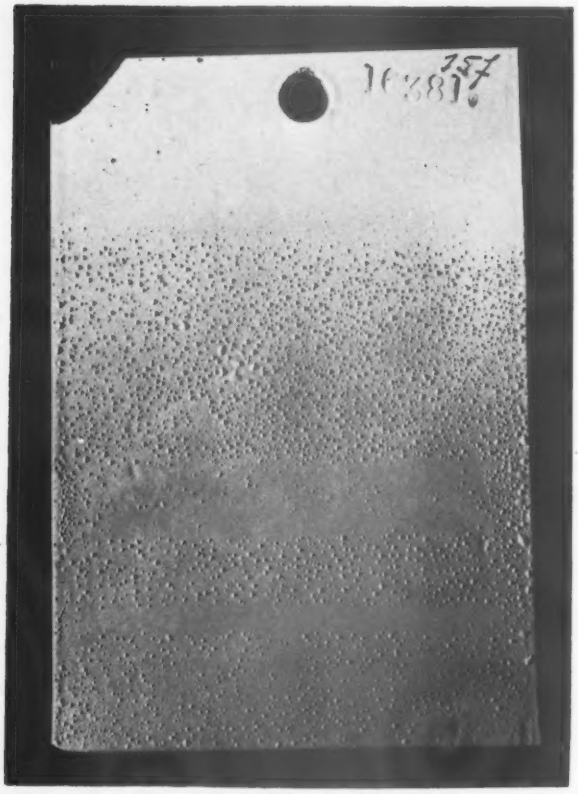

Figure 11. With a chromium steel interlayer, the Dia Phenomenon is clearly visible.

The Standard Paint System proved a most favourable material to show the Dia Phenomenon clearly in the Fresh Water Immersion Test.

Therefore, this system has been used extensively to determine the influence on the Dia Phenomenon of some pretreatments of substrate and of some variations in the method of applying the paint film.

Pretreatment

When applying trichloroethylene vapour phase degreasing (21) or pickling in 15% H_3PO_4 followed by rinsing with cold and hot water (7) the Blister Dia Phenomenon does not show. With mildly (wet) sandblasted steel (24) it is at its best and with heavily sandblasted (60) or shotblasted (medium) steel (43) it turns up only after 110 days Fresh Water Immersion Test and is less intense.

A mechanical treatment seems necessary. The figures given between parentheses behind each pretreatment indicate the mean values, for 8 panels each, of the number of days necessary to obtain blistering number 6 (Table 1).

Obviously, the blisters must not appear too rapidly, as is the case with the pickled steel, because the suppressing action takes some time to build up, nor too slow because in that case the whole phenomenon will be delayed and disturbing influences, always present, will have a relatively larger effect.

The case of the non-appearance with trichloroethylene vapour-phase degreased steel has been dealt with previously.

Variations in the Method of Applying the Film

What is the transmitting agent of the Dia Phenomenon across the metal?

An appreciable change of electric potential of the scratched part of the metal is ruled out, because the steel has a low electrical resistance. Could it be a deformation of the metal by the scratching, giving rise to a different potential at the Dia spot?

This supposition was checked by carrying out the scratching before and after the spraying of the paint. Only in the latter case the Dia Phenomenon occurs. It is the local absence of paint, therefore, and not the deformation of the metal, that is connected with the Dia Phenemenon.

This has been confirmed by leaving off the paint locally without deformation. It is not sufficient for obtaining a bare surface to draw a line in the wet paint with a piece of wood.

Likewise a wire, applied as a mask, does not prevent some paint to act as a protector of the metal, despite the thinness of the film.

Using adhesive tape 2-15 mm wide gives the best results. This is applied to the panel most of the time together with scratching.

The Thickness of the Steel Panel.

Will the Dia Phenomenon disappear at a certain upper limit of thickness of the panel and will the time of appearance increase meanwhile?

Steel panels of a thickness of 20, 10, 5, 3, 1.0, 0.9 and 0.3 mm are mildly (wet) sandblasted, partially coated on one side, completely on the other with the Standard Paint System and subjected to the Fresh Water Immersion test. Of course the reproducibility of this experiment is diminished compared with cutting all the panels from one piece. Duplicates from one piece behaved very similarly. The first two panels blistered after 4 and 1 day respectively. The evaluation no. being "6" then (table 1).

Therefore, the Dia Phenomenon was not likely to appear.

With the 5 mm panel a slight Dia Phenomenon appears after 55 days, on Dia side of the tape masked parts only, not at the scratch.

The panels of 3, 1.0, 0.9, and 0.3 mm show a slight development of blisters on the Dia side of the parts left bare after 17, 18, 4, 8, 4 days respectively. This constitutes a kind of Reverse Blister Dia Phenomenon. However, in the last three

Figure 12. The Dia Blister Phenomenon on preheated steel. Blister formation is general but more pronounced along scratches, masked (bare) areas, and panel edges.

cases, after 11 days, this blistering decreased and is more than overtaken by blistering on the Dia side of the coated front parts of the panel. Only the 3 mm panel after 33 days remains slightly more blistered on the Dia side of the bare parts but these may be due to the thickness of the metal, the said blisters being more widely distributed than those which appear sometimes along the blisterless areas in the case of a 1 mm panel (Fig. 13).

The blisters first appeaing on the Dia spot, which after 4-8 days did not increase and seem to have shrunk after 11 days, may be due to atomic hydrogen, lifting the film in the earlier stages of swelling, i.e. before water and oxygen dissolved in it have reached the metal surface. Or it may be that the corrosion gives a certain loosening and lifting of the film. When stripping the film, it was found to adhere best to the corroded parts when no Reverse Blister Phenomenon occurred. Fig. 6b shows remaining parts of the film.

According to Nelson and Effinger[2] hydrogen blisters will appear under a dry rubber base paint, applied to the outside of a sheet steel can, filled with a corrosive watery liquid. The pressure of the hydrogen may amount to several hundred atmospheres.

In a neutral liquid however the recombination of H-atoms is difficult, therefore the penetration of water into the surface stops this action in our case after some days.

Concluding it has been shown that the Dia Phenomenon agent is transmitted through a steel panel varying in thickness between 0.3 and 5 mm, and there is no proof that outside these limits the phenomenon would not occur.

The speed of appearance of the Dia Phenomenon seems to decrease with a thickness over 5 mm.

The Blister Dia Phenomenon on "Sandwich" Panels.

If the Dia Phenomenon is caused by atomic hydrogen, a barrier for the latter should stop it.

Two steel panels were hot-rolled together as such and also

Figure 13. The Dia Phenomenon on preheated steel. Dia Blister formation is general but more pronounced along the scratches, masked (bare) areas, and edges of the Dia side.

with an interlayer of copper or chromium steel (18% Cr). The total thickness of the resulting panel was always 1 mm, the interlayers were in both cases 0.05 and 0.15 mm thick.

Figure 8a, shows the result after application of the Standard Paint System and 20 days of the Fresh Water Immersion test.

In figures 8b, 9, 10 and 11 the samples were exposed for 46 days. Comparison between Fig. 8a and 8b representing 2 stages of development shows that the blistering starts along the bare spots, edges included.

Fig. 9 shows the Dia Phenomenon in absence of an interlayer. In Fig. 10a "Sandwich" Panel is shown with an interlayer of 0.05 mm of copper and in Fig. 11 this layer consists of 0.15 mm of chromium steel.

Of each kind of interlayer one picture is shown only, because there is no change when thickness differs. The Dia Phenomenon occurs only with the steel panels without an interlayer or with one of chromium steel. All those panels are permeable to atomic hydrogen.

The Dia Phenomenon does not occur with the panel having a copper interlayer because of the latter metal being impermeable to the hydrogen.

The Reverse Blister Dia Phenomenon is seen after 4 days with panel No. 157 but within 11 days the normal phenomenon is visible only. (Fig. 11)

The conclusion is, that the Dia Phenomenon is not due to a potential difference transmitted through the panel because this could not be influenced by a copper interlayer, but to atomic hydrogen diffusion.

Thermal Pretreatment

Heating of the panels during 4 hours at 180°C is supposed to drive out any atomic hydrogen that should be present from preceding corrosion thus giving a more reproducible result, shown in Figs. 12 and 13.

Panel 10500 has been treated thermally first and then as

(*Turn to page 88*)

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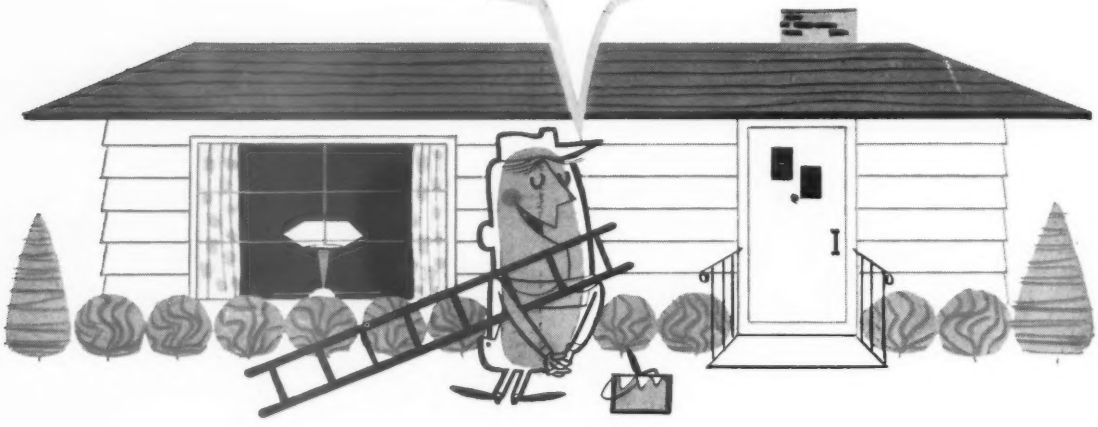

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MONSANTO BRINGS OUT THE BEST IN **PLASTICS**

Rheology— ITS INFLUENCE ON THE MANUFACTURE AND APPLICATION OF PAINTS

By
Herbert Bruss*

THIS paper deals with the influence of rheological properties on sagging, flow-out and brushability. It offers suggestion towards problems arising in the manufacturing process as well as the application of paints. It also refers to the significance of viscosity measurements for the production control guaranteeing the uniform quality of products.

Definitions

The terminology used in the science of rheology has not yet been standardized so that it will be necessary to define the terms used throughout in this paper.

Liquids which comply to the equation are known as Newtonian liquids:

$$\text{viscosity } \eta = \frac{\text{shear stress } \tau}{\text{rate of shear } D}$$

Newtonian liquids are usually low molecular substances which do not contain any foreign matters. By adding pigments to a Newtonian liquid, its character changes so that a so called Structural Viscosity** comes into existence; that is, the viscosity values become smaller with the increasing shear stress.

Further additions of pigments will finally result in a plastic behaviour, the sample thus has reached a Yieldpoint. This yield point is defined as the shear stress at which flow can be achieved.

In the paint industry, we know another important rheological property: Thixotropy. A substance is thixotropic if the viscosity becomes lower while shearing.

Dilatant paints become higher in viscosity with increasing shear stress. Rheopexic paints become higher in viscosity while shearing is seldom found in the paint industry.

Rheology of Paints

Sagging and Flow-out

The sagging is a flow property which is the result of the shear stress operating within the paint layer. The size of the shear stress is determined by the force given by the weight of the paint applied to the substrate. The shear stress τ on the substrate can be expressed by the equation:

$$\tau = T \cdot \rho \qquad (1)$$

T is the thickness and ρ is the specific weight. The shear stress at any point of the layer can be expressed by the equation:

$$\tau = (T - X)\rho \qquad (2)$$

Here, x is the distance of the assumed point from the substrate. This results in the rates of shear D:

$$D = \frac{\rho(T - X)}{\eta} \qquad (3)$$

By integration of this equation the speed V of flow on the surface of the paint is obtained:

$$V = \frac{T^2 \rho}{2\eta} \qquad (4)$$

The speed of flow at any assumed point in the layer is obtained as follows:

$$V = \frac{\rho}{\eta} \times \left(T - \frac{X}{2}\right) \qquad (5)$$

These equations are valid only for Newtonian paints. As far as structural viscous paints are concerned, one must consider the differential viscosity values due to the different shear stresses in action within the paint layer. The shear stress has its highest values at the substrate, on the paint surface they are non existent. This fact that structurally viscous paints possess differential "values of viscosity" within the paint layer makes a comprehensive mathematical evaluation of the sagging process difficult. In addition, the shear stress constantly changes as a function of the sagging of the paint.

Nevertheless, the equations (4) and (5) deserve closer consideration because they indicate that the speeds of sagging are determined by the viscosity assuming a constant specific weight. If thicker layers are to be achieved, the paint must possess a stand up resistance, namely it must possess a yield point which must be so large that the paint does not flow at the shear stress prevailing.

At the same time the equations give information on the great influence of the manner by which the paint is applied. If the paint is applied too heavily, the paint may sag in spite of its high yield point. In this case the remaining layer

*Brinkmann Instruments, Inc., Great Neck, N. Y.

**Also referred to as pseudo plasticity or quasi-viscosity

would be only a fraction of that layer which would be expected on the basis of equation $T = \frac{\tau}{\rho}$ if the applied layer had not been so heavy. This occurance can be observed on those paints where the yield point is overcome by prevailing shear stress only in the vicinity of the substrate.

If the calculation of shear stress is based on layer thicknesses of from 30 to 500μ and specific weights from 1 to 2 g/cm^3, then the resulting shear stresses extend from 3 to 100 dyn/cm^2. Measurements for the determination of sagging must be made in this range.

This range of shear stress exists also for flow-out. The result is that paints can be made with minimal tendency of sagging and a bad flow-out or more tendency of sagging and a good flow-out. A compromise can be obtained more easily by using thixotropic paints. In order to prevent further sagging the increase of viscosity must be arranged by selection of an appropriate time of regeneration which must take place after the flow-out or after a calculated maximum unevenness of the surface.

Brushability

While brushing, the rate of shear is given by the speed of the paint-brush and the film thickness. The shear stress which is necessary to maintain this rate of shear must be determined. If the shear stress is high, greater effort is necessary resulting in a greater fatigue of the painter. The force can be calculated by the equation.

$$F = D \cdot A \eta$$

Here, F is the force, D the rate of shear A is the area and η is the viscosity. If the paints are non-Newtonian the viscosity values have to be determined at the rate of shear existing while brushing. The rate of shear can be expressed by the equation.

$$D = \frac{\text{speed of the paint brush}}{\text{film thickness}} \ (\text{sec}^{-1})$$

If we assume a speed of the paint brush of 0.5 meters/sec and film thicknesses of 0.025 to 0.5 mm, we obtain a range of rate of shear of from 1000 to 20,000 sec^{-1}. In this range the viscosity has to be determined for the examination of the brush resistance.

Fig. 1. Rotovisko apparatus with temperature regulator and Couette attachement.

The Measuring Instrument

These explanations show the range of shear stress and the range of rate of shear in which the viscosity must be measured in order to solve problems in the paint industry.

The Rotovisco[1] provides measurements in a range of rate of shear from 10^{-1} to 10^4 sec-1 and range of shear stress from 10^1 to 10^6 dyn/cm$_2$. Viscosity measurements can be carried out under actual conditions existing during sagging, brushing and flow-out.

The Rotovisco measures torques which are the measure of the viscosity. The Rotovisco consists of a control cabinet, measuring heads and a number measuring elements. Measurements can be carried out at the following rpm: 3, 6, 9, 18, 27, 54, 81, 162, 243, 486. These speeds can be reduced by the factor 10 or 100 by using of one of two existing reducing gear boxes. The determination of the torque and its conversion to an electrical value is carried out in the measuring head: the friction in the flexible metal cable has no influence at all upon the measured values. There are two measuring heads with different dynamometers measuring torques of 500, and 50 g cm. The measurement can be made after the principle of Couette or plate and cone. The widths of the gap are very small with the Couette-measuring attachment in order to obtain a rate of shear which can be determined exactly and easily. By this means, it prevents the formation of different zones of shearing whereby different rates of shear would arise, depending on the structural viscosity and yield point. It should be mentioned that attachments with roughed surfaces are available in order to prevent slippage of the substance on the surface of these attachments.

1. Distributed by Brinkmann Instruments, Inc.

Testing of Anti-sagging-materials

Materials for the prevention of sagging are used in the paint industry in order to reduce or to prevent sagging. As the properties of application should not be altered, the increase of the viscosity should be obtained only in the range of shear stress where sagging occurs. This can be achieved by adjusting the structural viscosity. Therefore, it is possible to illustrate the effect of anti-sagging-materials by an increase of viscosity in the range of shear stress, wherein the sagging occurs and in the range of rate of shear in where brushing occurs. The anti-sagging-materials which yield a great increase in viscosity at small shear stresses and a small increase of viscosity at high rate of shear are more advantageous in the prevention of sagging.

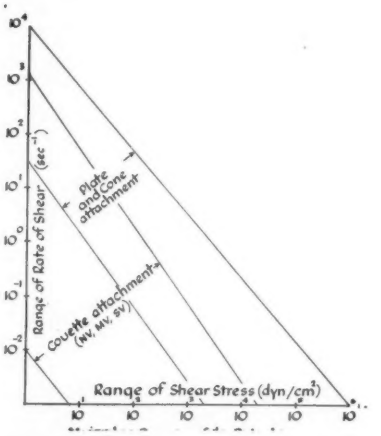


Fig. 2. Measurement range of the Rotovisko.

Figure 3 shows the flow curves of paraffin oil which contains 0, 2, 3, 4, 5, 7 % precipitated silicon. From this, one can see the great increase of viscosity in the range of shear stress of sagging and the small in-

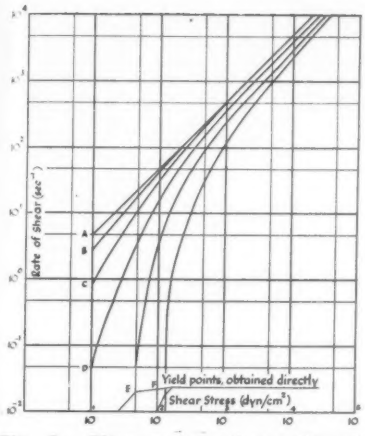


Fig. 3. Flow curves of paraffin-oil with precipitated silicon. A=0% B=2%, C=3%, D=4%, E=5%, F=7% silicon.

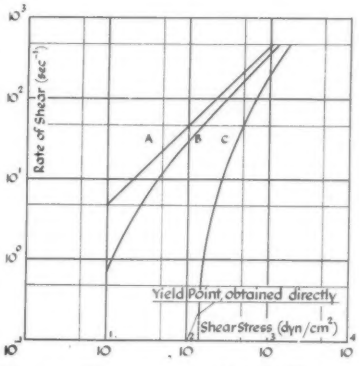


Fig. 4. Flow curves of paraffin oil demonstrating the effect of Aerosil. A=0% addition, B=3% precipitated silicon, C=3% Aerosil.

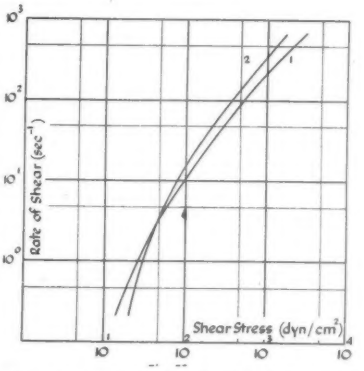


Fig. 5. Flow curves of two rust-resistant paints with slight differences in brushing qualities.

crease of the viscosity in the range of rate of shear of brushing.

Figure 4 shows the great effect of Aerosil[2]. Chemically, Aerosil is a finely divided silicon dioxide, produced by vapor phase method of preparation. An addition of 3% Aerosil has a greater effect than the addition of 3% precipitated silicon.

2. Produced by Degussa, Frankfurt, Germany

Testing Sagging and Brushability

Figure 5 shows flow curves of two rust resistant paints. A test conducted by a painter showed that the brush resistance of the paint 1 is a little higher than that of the paint 2 and that the sagging of paint 2 is slightly less than that of the paint 1. The measurement of the viscosity with the Ford-cup resulted in a time period of 97 seconds for paint 1 and in a time period of 90 seconds for paint 2. By a comprehensive examination with the Rotovisco the behaviour of these paints could be explained because the viscosity of paint 1 is slightly less in the range of the shear stress of sagging than the viscosity of paint 2.

Figure 6 shows greater difference in the flow behaviour of two other rust resistant paints than the two mentioned before Paint 1 possesses a good flow-out, paint 2 indicates a small tendency to sag. The flow curves obtained by the Rotovisco can explain the difference between these paints.

Figure 7 shows how the addition of Aerosil to a Newtonian polyester lacquer imparts yield points so that film thicknesses of 50, 80 and 220μ can be obtained.

Figure 8 demonstrates the flow properties of two putties. Putty 2 is designated as good by some painters because of the small degree of sagging and good brushability. This fact is shown by the flow curves.

Figure 9 indicates the viscosity properties of 5 different paints at high rates of shear. The numbers to be seen on the figure are the opinion of three painters referring to the brushability. Here paint 1 has

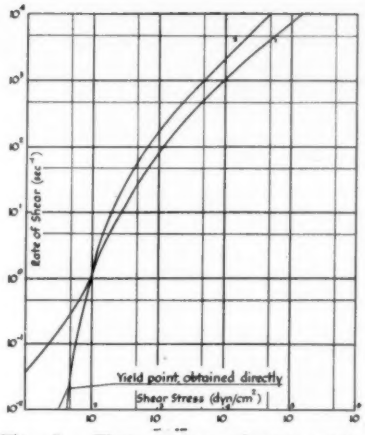


Fig. 6. Flow curves of two rust-resistant paints with a great difference in brushing qualities.

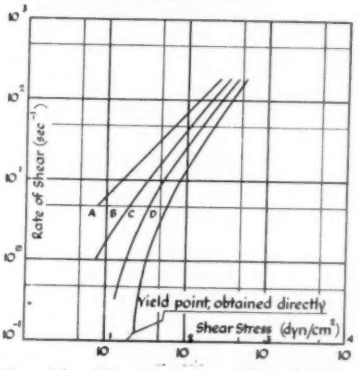


Fig. 7. Flow curves of polyester lacquer with Aerosil. A=0%, B=0.5%, C=1.5%, D=2.5% Aerosil.

the best brushability and paint 5 the worst.

Further measurements showed that in general the brushability can be judged by a measurement of the viscosity at high rates of shear. However, it is mentioned that sometimes differences can arise between the rheological properties and the statements of painters if:

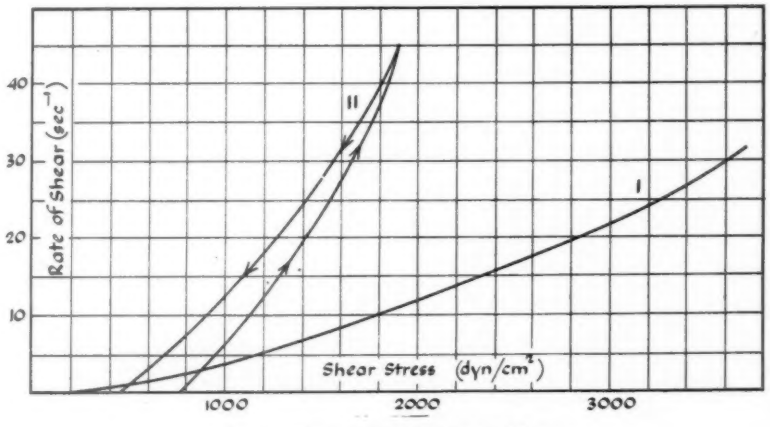


Fig. 8. Flow curves of two putties.

1) the viscosity of the paint is changed rapidly by the influence of the substrate.
2) there are different surface tensions resulting in differences in spreadability of the paints on the substrate.
3) there are great differences in the viscosity at small shear stresses causing different film thicknesses and different rates of shear.

Special Measuring Methods

The method for measuring thixotropic paints is determined by the problem which is to be solved. The brushability can be determined by measuring of the viscosity with the plate and cone attachment using the hysteresis-procedure. If, however, the sagging is the subject of examination, it is advisable to measure the time for regeneration at small shear stresses. This can be made with the Rotovisco by filling paint into the attachment MV of the Rotovisco. After a strong shearing, the viscosity measurement is made immediately or after 1, 2 or more minutes of waiting at small shear stresses in order to get some indication of the increase in viscosity.

The yield point can directly be determined before and after a shearing. This is important if thixotropic paints are to be measured. The determination of the yield point before the shearing can be carried out as follows: the lowest gear speed of the instrument is engaged. This results in an increasing torque. The operator must carefully observe that point at which the torque results in a movement of the rotor, for at this point the yield point is overcome by the torque. This torque is a measure of the yield point.

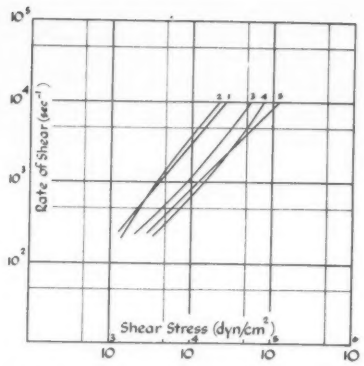


Fig. 9. Flow curves of five paints obtained at high rates of shear for determining brushability.

Another aspect of the measurement of the yield point is illustrated by the relaxation experiment. The dynamometer in the measuring head is stretched by switching on the driving mechanism for a short time. After switching off the driving mechanism the dynamometer has a tendency to relax, the rotor turns back until the torque in the measuring head is equal to the torque due to the yield point of the substance.

Further, it is possible to measure the time of reverse speed of the rotor so that you can obtain information about the flow-properties at small shear stresses, that is to say one can observe the time necessary for the relaxation of the spring indicated by the backward motion of the rotor. Table I illustrates some measurements which were made in this way. The table shows that the paint IV used for the last coat possesses the smallest viscosity values at low shear stresses which is desirable for a good flow-out, required in applying the final coat.

For the solution of technical application problems, it is necessary to measure the viscosity within the range of rate of shear and shear stress as they exist at flow-out, sagging, and brushing. Rapid determination of viscosity values is of secondary importance. If, however, the determination of the viscosity behaviour is made for production control a rapid measurment is of special importance.

Table I

Measuring viscosity with the Rotovisko by the relaxation method.

30	20	15	13	10	8	6	4	2	0 values of scale	
114	76	57	49.4	38	30.4	22.8	15.2	7.6	0 Shear-stress dyn/cm²	
				Paint I						
	160	280	340	460	600					
	150	255		360	465	660				yield point – 20 dyn/cm²
	140	255		420						
	170	290	350	486	640	1500				
				Paint II						
	85	360	570							
	30	270								yield point – 45 dyn/cm²
	12	135	500							
	12	150								
					Paint III					
				6	27	66	105	160	360	
				6	30	66	102	173	360	
				4,5	27	63	103	172	360	
				5	24	60	96	156	360	
				6	27	63	100	160	360	
					Paint IV					
	12	18		36	48	60		96	120	
	15		36	54	66	81		120	150	
	15	30		51				120	150	
	14	27		45				114	135	
	15	30		51				120	150	
					Oil 2980 cP					
				9			18		40	
	3			9			18			
		6					18		45	
		6						27	50	
							15		40	

Times in Seconds

Therefore, simplified methods for measurement are desirable. The question is how much simplification can be allowed without decreasing the value of the measurements. The flow behaviour of the Newtonian liquid can be determined by a single value of viscosity. In the structurally viscous liquids the value of viscosity depends upon the shear stress. Generally it is valid that

$$D = f(\tau)$$

Casson described the flow-law further by the equation:

$$\sqrt{\tau} = K_0 + K_1\sqrt{D}$$

Here, K_0^2 is the yield point, k_1^2 is the viscosity at high rates of shear. The linear relation is of great importance because the flow behaviour of suspensions being structurally viscous can be comprehensively determined by measurements at only two rates of shear; therefore it is possible to determine the yield point and the flow behaviour at high and small rates of shear by extrapolation of the flow curve.

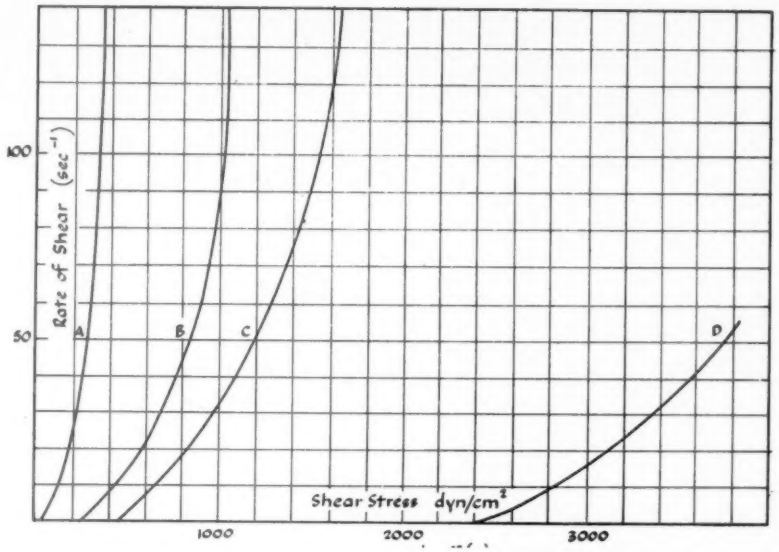
Figures 10a and 10b show flow curves of linseed oil and paraffin oil with different pigments in different concentrations illustrating that the yield point determined by the Casson equation agrees with the value obtained by actual measurment.

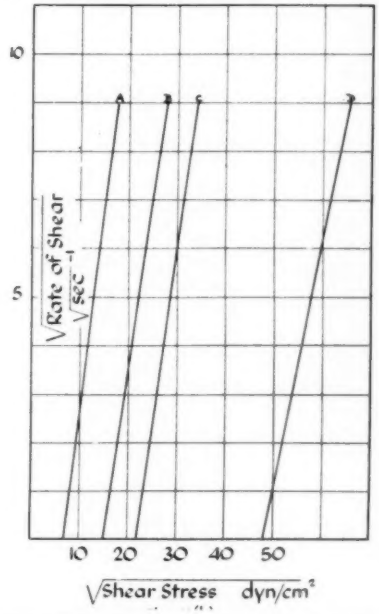
Figure 11 shows a polyester lacquer thickened by Aerosil also obeying the Casson law.

$$\tau^{\alpha} = K_0 + K_1 D^{\alpha}$$

It should be mentioned that it is first necessary to determine if the paints which are to be tested belong to a type of substance obeying the above mentioned equation. In the generalized Casson law the exponent a is 0.5 in many cases. In boiled linseed oil with pigments there was found (to be) an exponent of 0.67 was found; other values for this exponent are possible. On the basis of the established facts it is possible to recommend simplified measurments for the production control of a great percentage of paints. Thus, a simple measurement can be

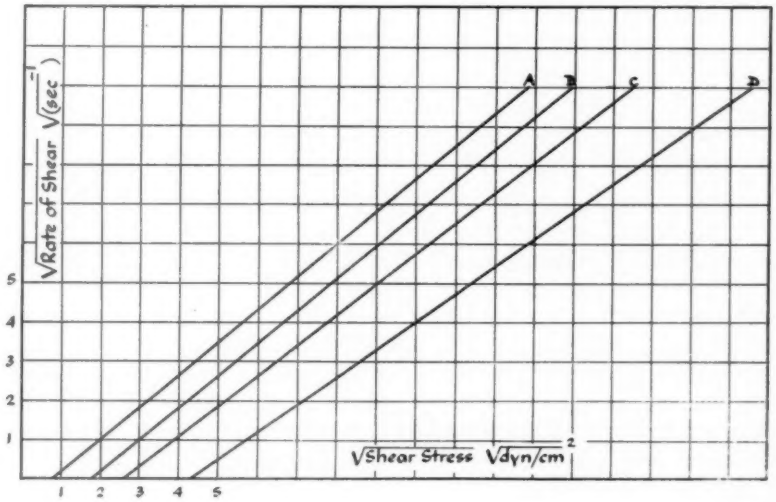
(*Turn to page 89*)

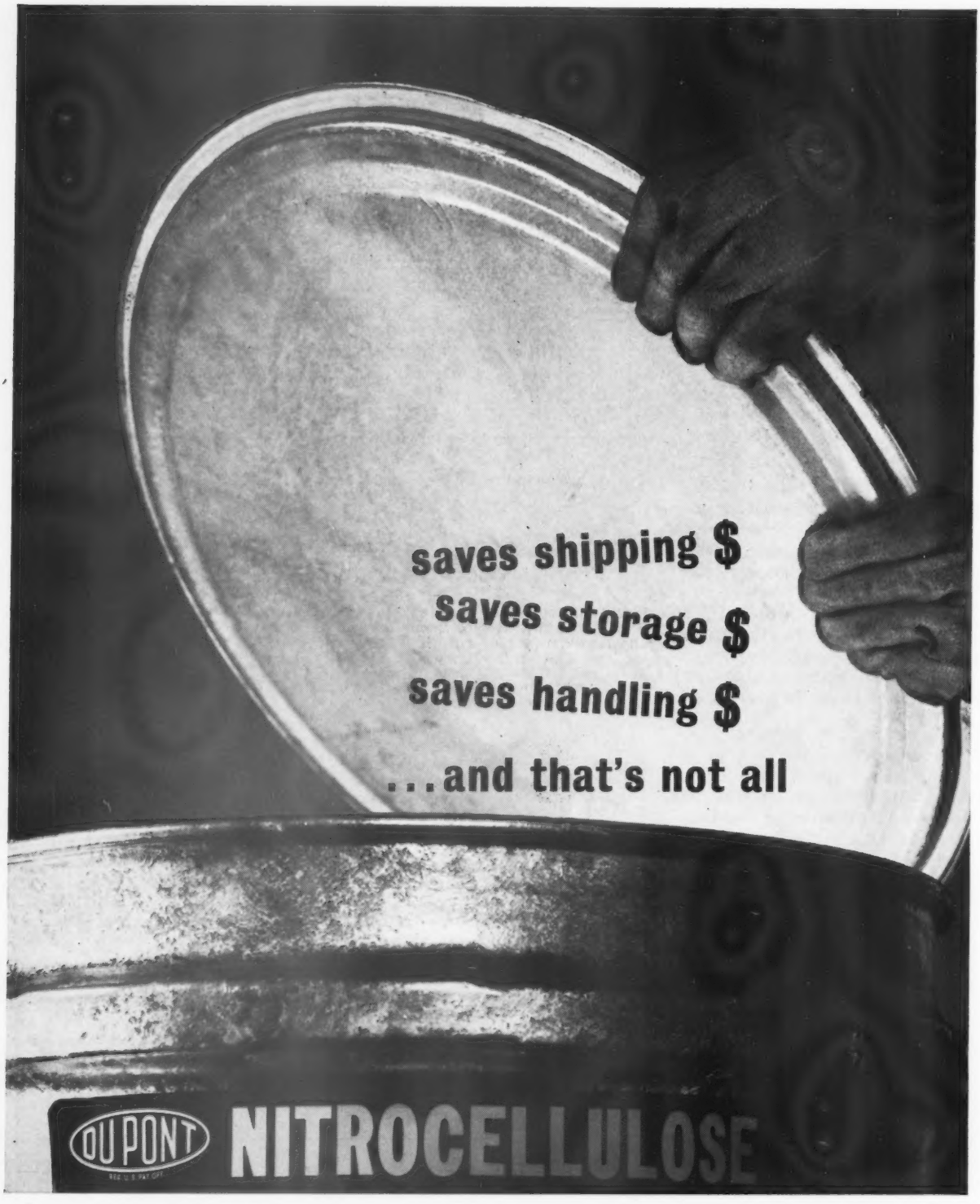




Figs. 10a and 10b (top and right) Flow curves of linseed oil and paraffin oil with different pigmentations obeying the Casson law. A=50% TiO_2 in linseed oil, B=40% ZnO in linseed oil, C=70% lithopone in linseed oil, D-50% lithopone in paraffin oil.

Fig. 11. (bottom). Flow curves of polyester lacquer with Aerosil obeying the Casson law. A=0%, B=0.5%, C=1.5%, D=2.5% Aerosil.





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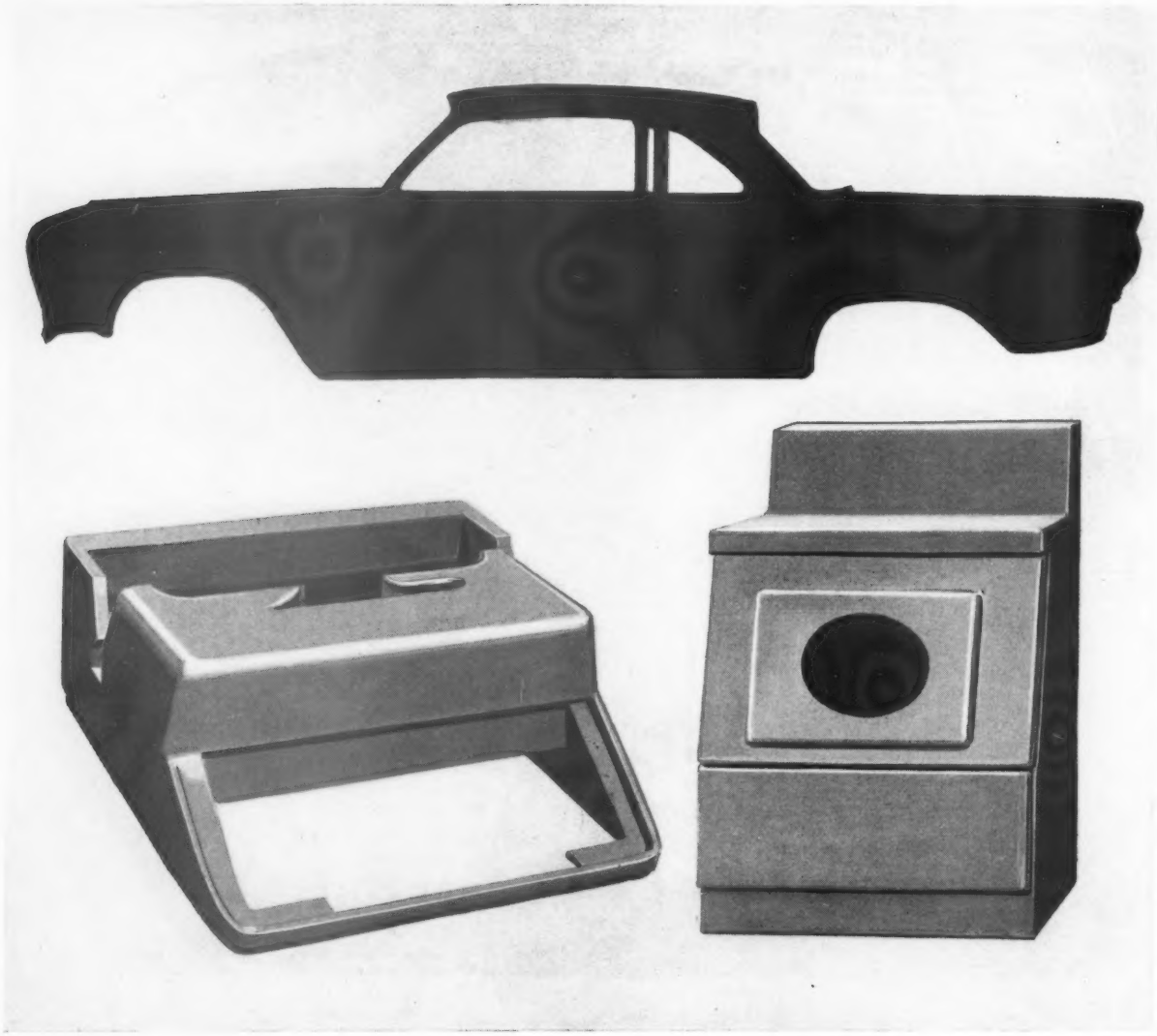
What's News in Enjay Resins...



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EXCITING NEW PRODUCTS THROUGH PETRO-CHEMISTRY

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ENJAY

By
Edward Anthony

The author expresses his random reflections on various aspects of the paint industry. The opinions contained in this column are his alone and do not necessarily reflect those of this publication.

Weather and Paint

THE regenerative weather of spring almost invariably brings with it heavy rainfall and melting mountain snows, resulting in awesomely destructive floods. Regional cooperation can minimize and even eliminate this destructive and wasteful problem, through the construction of dams, dikes, levees, or the other paraphernalia of that trade. Though initially expensive these control methods are very effective and when measured historically cost very little. Unfortunately, the problem of *flooding* in the paint industry has not proven to be ammeanable at all.

Flooding is characterized by the visual observation of a uniform, but different, surface color compared with the bulk of a wet paint film. No single explanation appears to serve all of the cases of this phenomenon. Only an Edisonian approach has any effect on the problem if, indeed, it is solved in a particular instance.

The antitheoretical situation—for the paint chemist—exists when considering *floating*. The hot, lazy summer days we are fast approaching are susceptible to the results to be gained from swimming or, better yet, floating, in a pool of refreshingly cool water. For our revitalized chemist—and I hope he is not merely a mythical creation!—there are remedies applicable to the condition known as *floating*, the non-uniform distribution of pigments in a wet paint film, either in a streaky (*silking*) or cellular manner.

These film eccentricities have been discussed and researched by numerous experimenters and theoreticians, since Bartel and Van Loo described them in 1925; see these *Official Digest* articles: "The Flooding and Floating of Multi-Pigment Paint Systems" by the New York Club, Dec., 1951; "Flooding and Floating Observations of Titanium Dioxide-Iron Blue Enamels" by LeBras, Bobalek, Von Fischer and Powell, Sept., 1955; and Van Loo's Mattiello Lecture, "Physical Chemistry of Paint Coatings" Dec., 1956. These are but a taste of the multitude of specific and general writings on the subject.

However such phenomena have been known for almost three centuries; Christian Huygens described a vortex situation back in 1678 (L.A. Logue, "Flooding and Floating in Paints" *Paint Manufacture*, Jan., 1961). Benard in 1901 characterized the vortex action of solvents in a film as a cellular type—giving his name to that peculiarly interesting physical appearance that looks as if one were actually viewing a macro benzene ring structure of the very polymers of which the film is composed.

In attempting to overcome a specific flooding problem, one could run the gamut of the formulative art, including investigation of the pigment type and its particle size distribution and degree of dispersion; wetting agents; solvent type and evaporation rate; vehicle viscosity, polarity and moisture content; and so on. Trial and error is the approach usually used to solve the problem—and past experience. Oft times the answer lies in a completely new or novel attack: an additive snatched from the sample shelf in desparation, a change in grinding procedure, a switch from one supplier of a raw material to another!

Floating is cured in most in-

stances by the incorporation of a silicone fluid. As simple as that. These Johnny-come-lately products of the retorts of the chemists' laboratories, which appear in so many varied guises, seem to concentrate at the film-air interface and therefore, in this instance, they act as a surface active agent.

This very brief review indicates the need for further effort designed to obtain basic *why-and-wherefor* knowledge, so that applicable fundamental precepts might be developed concerning those tremendously varied and dynamic pigment-vehicle-solvent systems with which we work. It is more than likely that the science of organic coatings is, even at this date, much like an iceberg—there is considerably more to be discovered and elucidated than has already been described.

Safety

CONSIDERING all of the hazards surrounding the man in the usual laboratory devoted to the investigation and formulation of surface coatings it is a great wonder to me that *more* accidents do *not* occur. And the same thought holds true for the manufacturing area. Actual figures, released by the Manufacturing Chemists' Association, are encouraging. The 1960 injury frequency rate in the chemical industry was 3.19 injuries per million man hours worked, less than half of the 6.47 average for all manufacturing concerns. Through the three years of 1956, '57 and '58 the rate hovered about 3.00, went up to 3.38 in 1959, and dropped down again last year.

As a goal for all of us to aim toward, consider that DuPont's 90,000 employees worked over 14 million man hours during April of this year without a single lost-time injury! Such a record could only be achieved by thorough planning, installation of safety devices, complete and continuing education of all personnel, and a rigid and enforceable inspection system. The results of management-labor teamwork can earn no more satisfying plaudits than through such a worthwhile objective as safety.

The National Fire Protection Asasociation reports that in 1960 the chemical and petroleum industries of this country and Canada suffered 16.6 per cent of the $87,800,000 lost in the 133 industrial fires with losses above a quarter of a million dollars. This total is over $29 million more than in 1959.

The safe way is not always the easy way, but it is certainly the best way. The dangers inherent in handling the raw materials that go into paints, particularly solvents, can not be over-emphasized. Whether in the factory or in the laboratory, an ounce of prevention in each gallon is the best ingredient you can put in your paint.

Safety suggestion: stamp a safety slogan—a different one each month—on the bottom of each batch card, in red.

Paint Power

I HAD always thought that the guiding phrase of the *Ladies' Home Journal* was "Never Underestimate the Power of a Woman". Picking up the June issue the other day I noticed that the cover carried the legend, "The Magazine Women Believe In". Which ever their current slogan, that monthly does seem to exert substantial *power* over the *beliefs* of women.

All of this is by way of introduction to a two-column article in the above-mentioned issue, on pages 116 and 117, by John Brenneman.

Appropriately titled "Why Does Paint Peel?", it is packed with helpful tips for the home owner, being particularly aimed toward "a method of painting [that] can give your house extra beauty and protection."

After thoroughly explaining the moisture problem and pin-pointing its contribution to the peeling menance, Mr. Brenneman (an Associate Editor of the magazine) delineates the preparatory steps to re-painting. Then he comments on six other means by which paint can fail: chalking, cracking, mold and dirt collection, nailhead staining and rusting, the deleterious effects of flat-grained siding (as compared with edge-grained type), and interfilm adhesion failure.

Certainly an article of this sort points up some of the weaknesses of paint, but it also emphasizes that by proper and sound decisions one can "get the long-wearing beauty and protection that good paint can give to your house."

That's good advertising for our industry! Both in a national publication and when your neighbors view the results!

Status

THE primary task of the professional employee is to enhance the welfare of his employer . . .by working to increase his employer's future potential." "The nonprofessional employee contributes to the maintenance of his employer's current existence. . .[he] performs actions already determined by the employer to be those that will enhance the employer's welfare." Here are two elementary differences between a person *practicing a profession* (of chemistry, or of engineering, for example) and his production line brother, as brought out by J. A. Young in his cogent summary, "Chemists, Unions, and Professionalism," in *Chemical and Engineering News*, May 1, 1961.

In the chemists' and engineers' continuing attempt to attain the status usually ascribed to the *independent professionals* — physicians, lawyers—the mental struggle has, far more often than not, gone against joining a union. The tremendous socio-economic influence increasingly wielded by labor unions during the past half century has improved the lot of *all* of us. And still, we turn away.

Why? Dr. Young, chairman of the chemistry department at King's College, Wilkes-Barre, Pa., emphasizes the differing character of the job and contribution of these two essential groups of people. Prior training and knowledge—improvement of initiative—close relationship to one's work—the existence of degrees of competance—to pursue new and better methods of accomplishing objectives—the fact that a material object is not produced and that its quality is determined by an intellectual contribution—that a fixed period of time cannot be ascribed: these are among the salient differences he emphasizes.

That such articles are often published in responsible trade journals is vivid evidence that the mental image the chemist and engineer has of himself, professionally, is not a full-blown one. While his contribution to our society is a deep and broad one, his position leaves much to be desired. Certain it is, the proper employer-employee and layman-professional *rapport* has not been achieved as yet.

EFFICIENT FLATTING AGENT

Diatomaceous silica, used primarily as an inert extender and flatting agent, is effective because of the unique structure of diatoms.

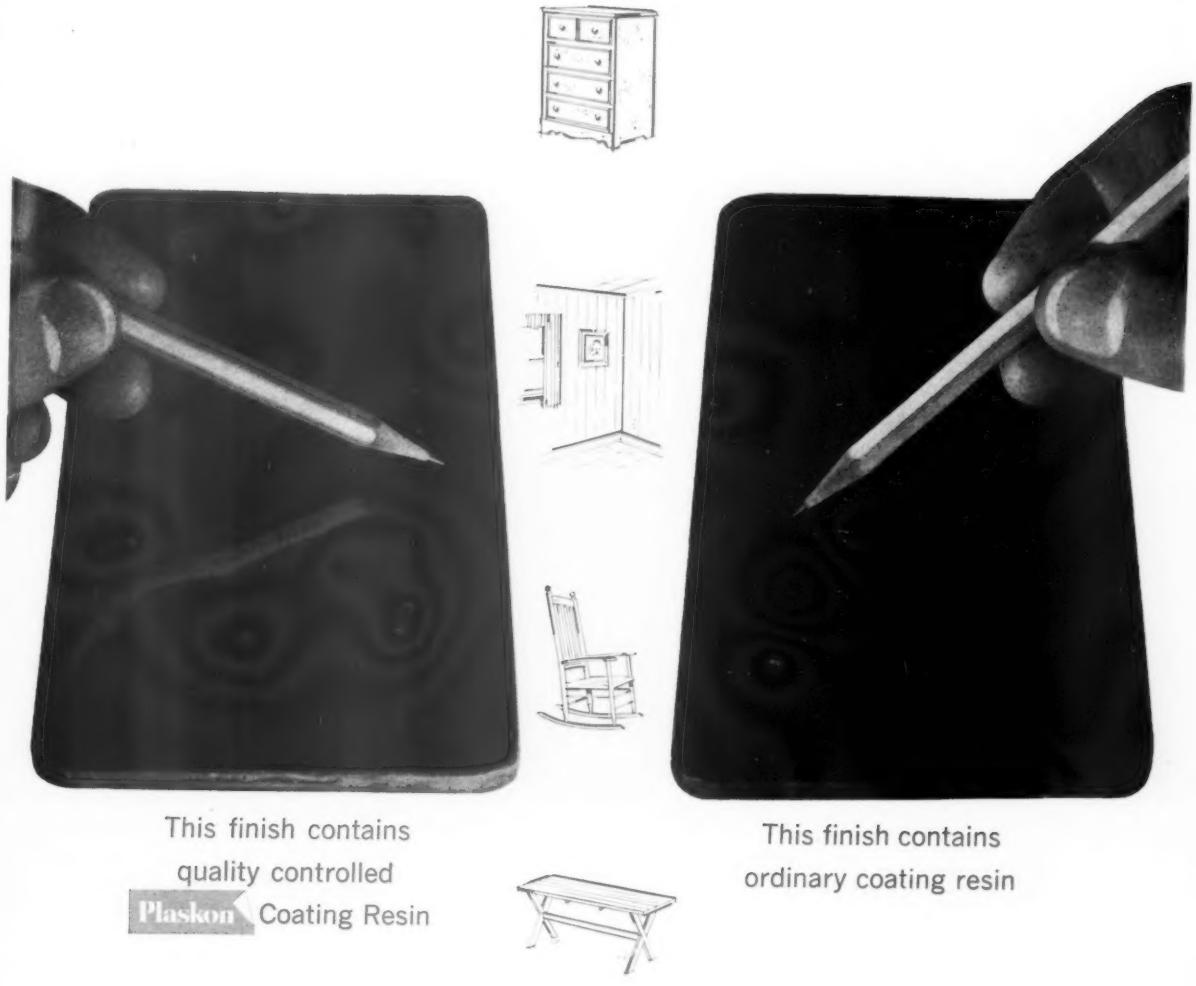
Photomicrograph shows typical diatoms found in various deposits of diatomite from which the raw material is produced.

DIATOMS—the source of diatomaceous silica, or diatomite—are microscopic aquatic plants. As these plants died, ages ago, their skeletons formed sedimentary deposits. The mining of these deposits has yielded diatomaceous silica, a raw material with an unusual particle structure. The unique-shaped particles have indentations and pores that give them added surface area; their light weight provides excellent suspension properties. They are chemically inert in organic-based paints. Their microscopically "toothy" character improves coat-to-coat bonding and hastens drying.

Flatting agent is added to a water-base formulation. Mixture follows a gravity flow to floor below where it is transferred to blenders or post-agitators.

According to George S. Kashmer, chemist at the Dunn-Edwards Corporation in Los Angeles, the flatting efficiency of diatomaceous silica makes it possible to produce a wide range of architectural finishes ranging from a high sheen to a dead flat. This is true for both oil and water-base paints. Since this firm specializes in architectural finishes, this flatting efficiency is especially important in many of their formulations, which may be used on long expanses of unbroken wall or ceiling where lack of undesired reflectance at low angles of incidence is important. Depending upon its use in formulations, diatomite can produce flat films at any angle of incidence. A sheen reduction of fourteen units for each five per cent of titanium calcium pigment replaced is currently obtained while maintaining the required qualities of adhesion, durability and flexibility in the film. The degree of sheen, of course, may be varied depending upon the amount used, diatomite will extend the hiding power of prime pigments without degrading the color or losing whiteness. In addition, the shape and nature of the diatom particles results in an interlacing action in the paint mix, producing a more elastic and distensible paint film. Microscopic "breathing" pores are also formed by diatomite particles, allowing moisture to escape without rupturing the film.

Compare these panels for gloss!



This finish contains quality controlled Plaskon Coating Resin

This finish contains ordinary coating resin

Compare these two unretouched photographs of clear finishes on walnut panels, after comparable weathering. You will notice the excellent gloss retention of the finish to the left. It is made with quality controlled Plaskon Coating Resin, a catalyzed system containing tall oil alkyd #3129 and urea resin #3353. Poor quality materials can cause the dull, lifeless appearance so obvious in the right hand panel.

Quality control checks are run on Plaskon Coating Resins throughout their manufacture . . . from selection of raw materials to finished resins. True, this extra care and attention costs a little more. But measured in terms of your customers' satisfaction, it is a mighty shrewd investment. More details? Drop us a line.

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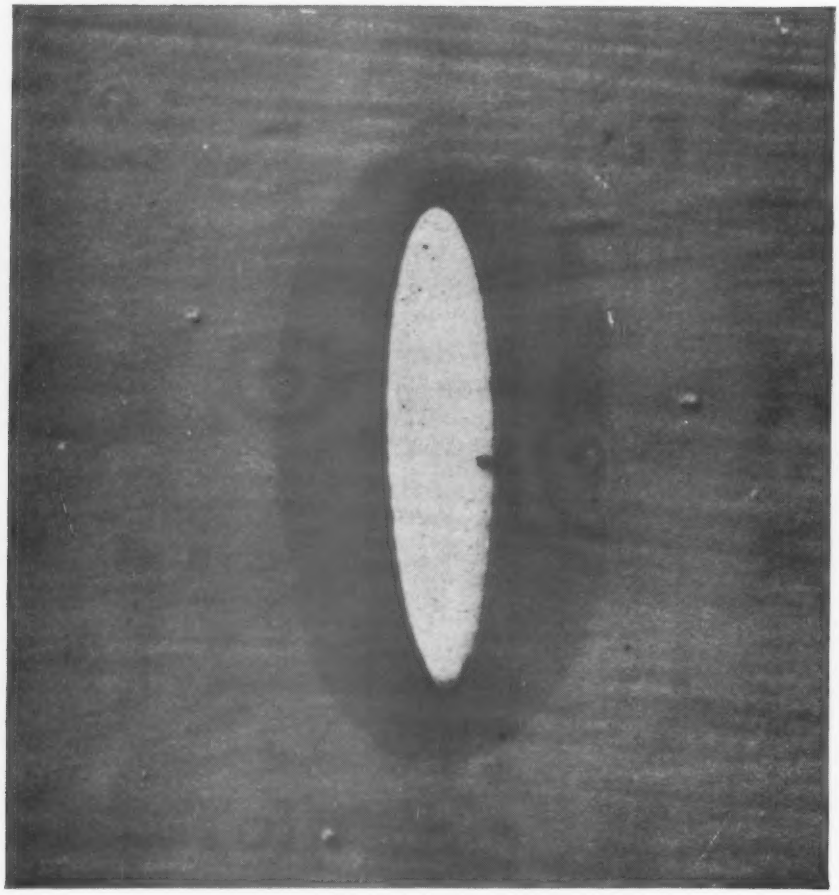

Modifying oil exudes from this drop of latex paint, soaking into the old surface chalk to form a sound paint base.

After 2 years' exposure, this Dow Latex 2647 topcoat shows no peeling or film failure over chalked oil paint.

This oil ring shows why LATEX 2647 PAINTS retain adhesion even over oil-paint chalk!

Exterior repaint finishes made from Dow Latex 2647 retain excellent adhesion and film integrity—even over *heavily* chalked oil paint—after modification with stirred-in oil.

A small quantity of linseed oil previously stirred into the paint is exuded as the Dow Latex 2647 vehicle dries. The oil is forced into the surface chalk, wets it out, and forms a sound, durable bond between the repaint finish and the weathered substrate beneath. The resulting long-term adhesion is outstanding.

Though this stir-in-oil technique is not new, it works exceptionally well with paints made from Dow Latex 2647. The modifying oil (with added drier and preservative) can be added either by the paint manufacturer—as a component of the finish—or by the painter just prior to application. On standing, the oil will cream out eventually, but can be easily redispersed by hand stirring.

Dow Latex 2647 repaint finishes also have exceptional resistance to blistering, regardless of humidity or of moisture content of the substrate. The result is outstanding repaint durability plus latex's easy application and quick clean-up.

Consider Dow acrylic Latex 2647 for formulating *or reformulating* your line of latex repaint finishes for exterior wood. For information and data on Dow Latex 2647, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 1905DL7.

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Discussing automobile color preferences with Mr. Beckwith is Norma M. Potkanski, Rinshed-Mason Color Styling Chief.

Beckwith Sees Complexities Increasing in Auto Finishes As New Designs Emerge

OVER the years automobile painting has grown to be the most important, the most complicated, and the most controversial application of industrial finishing. Automotive finishes are being required to meet ever varying and increasingly complex conditions of metal cleaning, baking schedules and tightening economy standards. The future will bring an even greater increase in these complexities as more involved mechanical systems are added to the automobile, either on the basic construction or the accessory list.

As these variables of metal surfaces and conditions of application and cure grow by the increased variety, number and complexity of mechanical parts and designs, the steel maker and the paint maker must find means of reducing the variables in producing each lot, according to Newell P. Beckwith, Vice President and General Manager of Rinshed Mason Co., of Canada, Ltd.

PRESENTLY studies in the automotive research laboratories show considerable variation from piece to piece of steel all from the same lot. The technology of processing steel is progressing and the causes of these variations are being better understood. Gradually variations from sheet to sheet are being minimized. As we get to know much more about the surface structure of steel on which the paint is to be applied, the paint technicians will be better able to design and coordinate paint systems which will be easier and more foolproof to apply as well as having greater durability.

The paint supplier is also studying the variables between lots of each of his raw materials. Great progress has been made, and greater advances are yet on the way, in the development of raw materials which are purer, more uniform, and more predictable in their separate contribution to the paints in the finishing system.

THE development of workable thermoplastic acrylic finishes for one major automobile company was made practical by new availability to the paint suppliers of chemicals such as acrylic monomers new low volatility plasticizers and special high boiling solvents—all purer and more consistent from lot to lot than ever before. The result is an acrylic finish astonishingly uniform in a very narrow molecular weight range of the polymer.

Now similar technology and special uniformity in chemicals available have resulted in thermosetting acrylic finishes which are under extensive testing, by several automobile companies, as early replacement for the classic alkydamine enamels.

One can only imagine what finishing systems the future will see on automobiles. When the chemists combine the genes of the past and present formulations with the environment of new molecular building blocks, it is trite but true to say that anything can happen.

LET'S guess what direction some of the future formulations may take. It is quite conceivable that metallo-organic polymers will be synthecized with the metal portion lending a close physical relationship between the steel, aluminum and alloys on the one hand, and the metallo-organic binder of the paint on the other. The ultimate sophistication of the metallo-organic structure would minimize the stresses which so severly characterize the physical, chemical, and electrical relationships between the metal substratum and the vehicle of the paint.

There has been considerable progress made in the technology of water based paints for finishing various parts of automobiles. But this has been an agonizingly slow evolution, and many obstacles have yet to be overcome. The greatest promise for the water based finishes on automobiles appears to be in the underbody and parts priming.

Another intriguing speculation is the totally non-volatile finishes. When such finishes are refined to build two to three mil dry film thickness in a single spray application, they could in use greatly reduce the length of the automobile finishing line.

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Pour a bag of XX-631 into any of the new high-speed dispersers. By the time it takes to pour the full contents of the bag, practically all the zinc oxide will be dispersed. You can't match this for speed.

Prove it to yourself!

THE NEW JERSEY ZINC COMPANY 160 Front Street, New York 38, N. Y.

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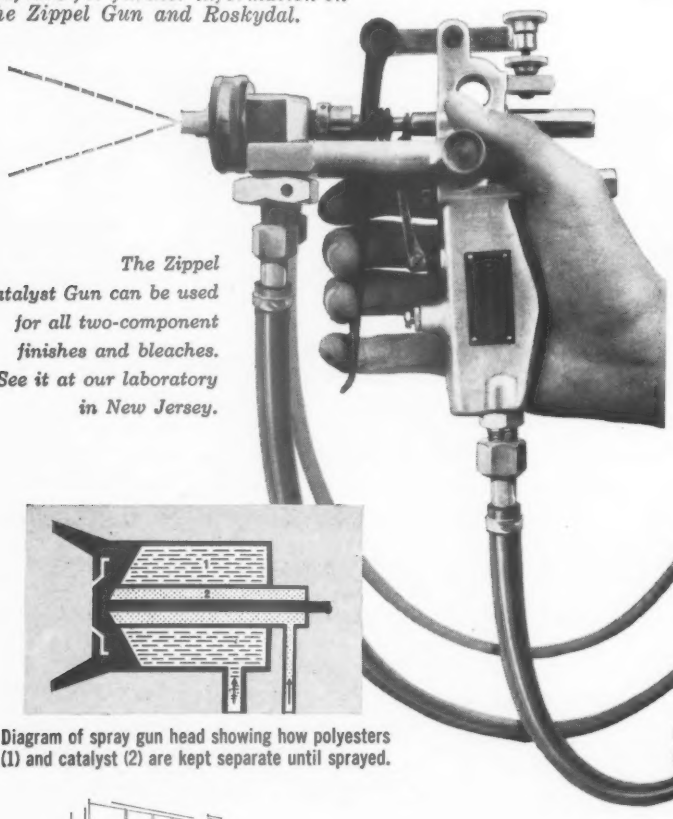
PHILLIPS PETROLEUM COMPANY
Special Products Division
Bartlesville, Oklahoma **Phone: FEderal 6-6600**

NEW "GUN" FOR TWO-COMPONENT FINISHES

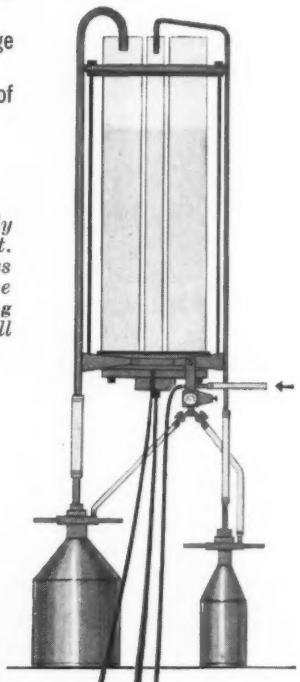
...keeps components separate, mixes them under pressure in spraying

- Material may be left standing in assembly . . . cleaning is easy . . . because components remain fluid
- Viscous materials designed for vertical surfaces can be sprayed—containers are pressurized
- Therefore lower pressures may be used in spraying . . . reducing "orange peel" patterning
- Visible feed gives accurate check of ratio during spraying—containers are of special, durable glass
- Adjusting-screw on gun makes it easy to maintain ratio
- Handles easily—gun weighs only about 1½ pounds

Save time and work with the ZIPPEL CATALYST GUN assembly —the most efficient two-component spray equipment on the market. Holds components apart in separate visible-feed containers . . . forces them together in the air stream at the gun exit in spraying. See illustrations. Developed especially for applying* ***Roskydal air-curing polyester resins*** *to wood, plastic and metal surfaces. Write or call Naftone for further information on the Zippel Gun and Roskydal.*

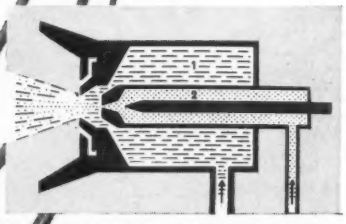


The Zippel Catalyst Gun can be used for all two-component finishes and bleaches. See it at our laboratory in New Jersey.

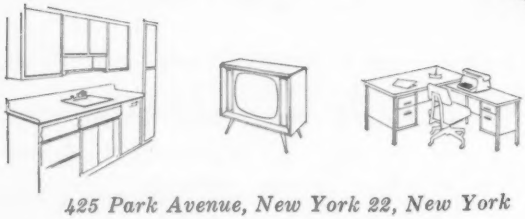


Flow-out containers give a visual check on rate of drop of the separated components...eliminate change of ratio owing to fluctuations of pressure in the ring main ...can be refilled direct from supply can with a pressure siphon.

Diagram of spray gun head showing how polyesters (1) and catalyst (2) are kept separate until sprayed.



Polyesters and catalyst mix thoroughly under pressure in the spray gun nozzle as they leave the gun.



*Protected under U. S. patent

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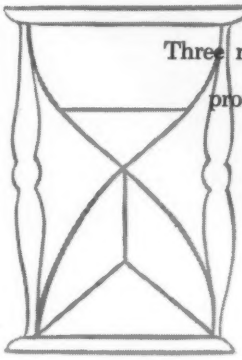

Three new chrome yellows
provide outstanding resistance
to darkening on exterior exposure

FAST PRIMROSE FR 2100

FAST LEMON FR 2101

FAST MEDIUM FR 2103

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*FADE RESISTANT

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DIVISION
THE HARSHAW CHEMICAL CO.
CLEVELAND 6, OHIO

Kentucky Color & Chemical Division
The Harshaw Chemical Co.
Cleveland 6, Ohio

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Samples FR-2100 ☐ FR-2101 ☐ FR-2103 ☐

Company Name _____

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City _____ Zone ___ State _____

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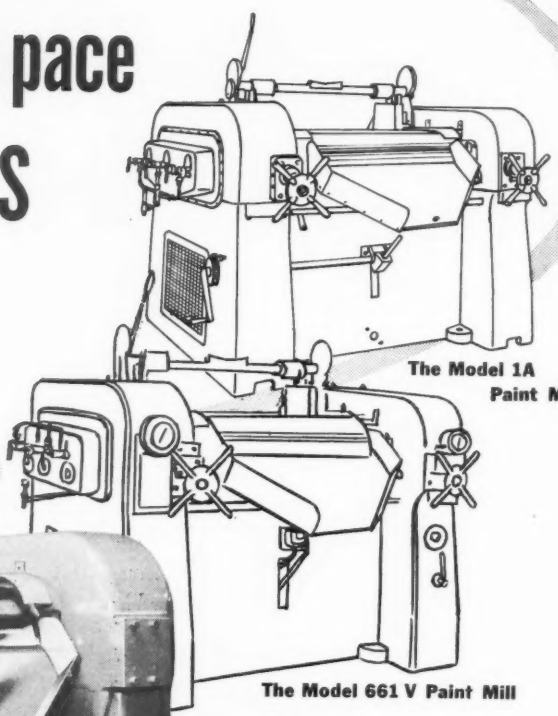
Why do people come all the way to the marble mountains of Tate just to see a test fence?

It's not very big by comparison to many others. And Tate isn't exactly a next door neighbor to Atlanta, much less the rest of the country. ▪ But they do come. And the reason is simple: they get ideas. Some of the experiments we make are unique in the field, and in more than a few cases, the practical applications of these tests have contributed significantly to lowering the costs of paint manufacture without, of course, compromising quality. ▪ One more thing. We don't preach about our products. We're working for the industry, and anything we uncover is yours to use if you can. If it involves our products, fine. But that's not the criterion. ▪ Besides, it's beautiful down here.

Having difficulty getting yellow pine panels? Some time ago, one of our customers mentioned that he was having a hard time finding yellow pine for his test fence. It so happened that we produce a reasonable supply on our own properties, and we told him we would be glad to furnish his requirements at our cost. Since then, we've been doing just that, and it occurs to us that others of you might be having the same trouble, too. If you do, drop us a line. We'll be glad to supply you with yellow pine, as long as we have enough to go around.

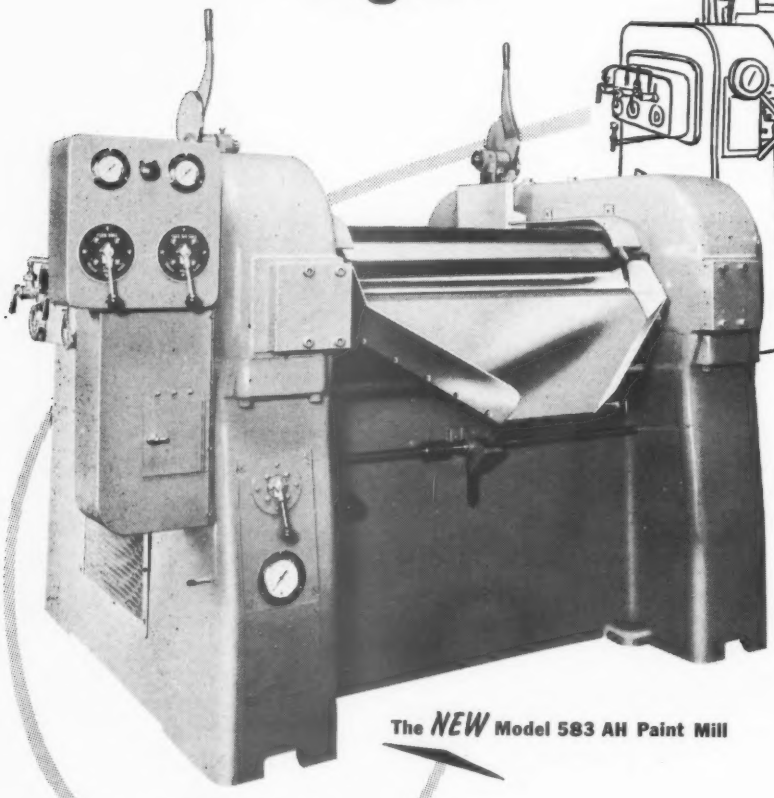
C P D **Calcium Products Division**
THE GEORGIA MARBLE COMPANY, TATE, GEORGIA
Manufacturers of: GAMACO* • CALWHITE* • #10 WHITE GAMAKAL
KALMAC* • WINGDALE WHITE
*Registered trademarks of The Georgia Marble Company.
Plants at Tate, Georgia, and Wingdale, New York

LEHMANN sets the pace in PAINT MILLS —again!



The Model 1A Paint Mill

The Model 661 V Paint Mill



The *NEW* Model 583 AH Paint Mill

Available in horizontal design as shown, or with vertical roller arrangement.

LEHMANN Paint Mill engineering has created at least three important break-throughs in paint making technology. First was the introduction about thirty years ago of the Lehmann Model 1A, the first modern mechanized paint mill. The second was the development about 12 years ago of the Model 661 V—first of the Sight-O-Matic type of mill.

Now Lehmann offers the new Model 583 AH, a completely hydraulically controlled paint mill of the newest design. In this the control points have been reduced from four to two. Adjustments are made by pressing a mushroom type button. The center roll is fixed, only the two outer rolls being movable to adjust pressures. A flick of a valve handle activates the Float-O-Matic feature introduced by Lehmann some years ago.

As each of the three Lehmann Paint Mill models mentioned has been introduced it has been unsurpassed for production among all mills previously designed. Each has been notable for increasing the mechanization and reducing the human element in this type of equipment.

Ask us for complete information regarding our new Model 583 AH Paint Mill — the newest machine for reducing paint making costs.

LEHMANN®

world renowned in processing machinery

J. M. LEHMANN COMPANY, Inc.

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550 New York Avenue, Lyndhurst, New Jersey

PRODUCTION

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS

Ball valve manifold controls flow of 13 liquid materials for formulating paint. Ingredients flow from pipe system through ball valve to manifold through strainer-de-aerator through meter to mixing tank. For details, see page 71.

A good sign for everyone in the industry!

There are plenty of "wet paint" signs all over the country these days! Shows lots more people are fixing up, sprucing up and painting up.

Canco is proud to be a part of all this . . . especially proud that its many developments have been so enthusiastically accepted. The COLOR GUARD can, for example. It has many new features, including *clinched solderless ears that give this carry-safe can the strongest handle ever; smooth exterior surface unmarred by flux spatter; stronger bottom profile that prevents bulging; recessed plugs for safety and stackability.*

COLOR GUARD is but one in a series of paint can developments by Canco. Call your Canco representative soon and let him tell you about the many sales-making advantages of Canco paint containers.

CANCO Division AMERICAN CAN COMPANY

New York • Chicago
New Orleans • San Francisco

MANAGERIAL & ECONOMIC ASPECTS of PROFITS and WAGES

By

Lawrence Shatkin

The term profit has been defined in many ways, some linking it with the historical past, and others focusing on the future.

The concept of profit emerges when we attempt to define a business in terms of profit. Profit is interpreted differently by the businessman, economist, and accountant. Some think the purpose of a business is to maximize profits, while others believe it to be the providing of economic goods and services.

The first concept is theoretically wrong because you do not get the true function of the profit motive. Profit has the primary function of motivating people, while the idea of maximizing profit becomes a moral problem. Profit must fulfill a function whose activity is always focused on the future.

Purpose of Profit

1. The only source for the risks undertaken involving future action;
2. Required as a source of capital for expansion;
3. To replace the capital that is destroyed by innovation;
4. Provide information for feed-back control.

Risks are innovation and the primary purposes of profit. In thinking about profit objectives one should be cautious and bear in mind that nothing is ever on the average or on the trend line.

Opinions expressed in this feature are not necessarily those of any particular firm or organization.

Other Views of Profit

1. Profits are considered a residual, or something that is left over;
2. Profits are considered an unearned share;
3. Profits are a reflection of the business cycle;
4. Profits are a measure of monopoly power.

There hasn't been any other share of our national income that has fluctuated as widely as profits—from a deficit in the early 1930's to 14% in 1943. In recent years it has varied from 9% to 12%.

Functional Theory of Profit

Profit is not a residual but a normal occurrence, in which there is a functional basis for its existence. Profit is an earned share connected with productivity and viewed by many as a return on capital.

The extent of profit is determined by the skills of management, their assumption of risks, and their ability to adapt to changes in a dynamic society. This is not to imply that profits vary with risks, for we cannot correlate the profits in the airline industry with the food industry. It is not sufficient that one does risky things to be paid. These things must be productive.

Non-Functional Theories

1. Profits are viewed as a class income;
2. Profits are viewed as a residual, involving exploitation;
3. Profits are referred to as the difference between expenditures and income.

Reasons for Limiting Profit

Why should a company refrain from seeking a maximum profit? Several answers can be given to this question. In the first place, maximizing profits may not be the best course of action for long-range planning. It could bring in competitors sooner than expected. A very high rate of profit is viewed critically by the customer, the public, and the government. Also, it could cause organized labor to press for higher wage demands. I think management has a social responsibility to establish standards of reasonable profit to insure the growth of a business.

The Entrepreneur

The enterpriser is a decision-maker, and it is the kind of decision that makes his function important. A variety of alternatives confront the decision-maker, and he must choose the one that comes closest to anticipating the consumers' wants. There is an assumption of risk and an ability to assume this risk which classifies policy decisions as an enterprise function.

The key to profits is based on the ability of the manager to increase the productivity of all the other factors of production, and to direct the production of commodities and services that in effect are worth more than they cost. This creates his own net share which measures the contribution of the enterpriser. Decisions, right or wrong, determine the differentials in profit. The

entrepreneur creates his own demand unlike other production factors.

Scientific Wage Theories

1. *Subsistence Theory*—This was the Iron Law of Wages associated with Ricardo in which the cost of subsistence determined the wage rate. Eventually, subsistence tended to equal that constituted as a comfortable living, and this theory lost its original meaning.
2. *Purchasing Power Creation Idea*—Wages—Purchasing Power—Savings. This theory does not place a limit on wages. However, we tend to look at wages from the spending side instead of the production side.
3. *Bargaining Power Theory*—What determines the bargaining power? Such determinants are the cost of living, standard or budgeted hours, pattern of wages, and ability to pay.
4. *Pattern of Wages*—This comes about when several key contracts are consummated, and a pattern of wages are set in that particular industry.
5. *Ability to Pay Principle*—Profits are viewed as a residual.
6. *The Growing Use of Arbitration*—This is an institutional approach which has been expending.

Ethical Wage Theories

1. *Guaranteed Annual Wage*—The strongest argument in its favor is ethical. It has no basis in economic theory, and is not considered a wage but a transfer payment, which results in a redistribution of national income.
2. *Minimum Wage Laws*—These are based on an ethical concept which has nothing to do with economic theory.
3. *Profit Sharing*

Definition of Wages

Wages are that share in the total income which is attributable to labor and is the value of the labor service. The relative importance may have little relationship to its productivity. The value of the service is different than the product of the service. Different wage rates can be explained by imputed productivity.

We must avoid emphasis on average wages. We are interested in individual wage rates. The totals and averages are built on individual or marginal rates. It is the margin that determines the average.

In establishing business policies, we must determine our objectives. Management must give purposeful direction to the business enterprise.

A business should be defined through its market, which is customer oriented, whose primary purpose is to create a customer.

Most companies are undergoing a cost-price squeeze which will get worse unless wage increases are supported by increased productivity. If this does not occur, then prices must rise, if possible, in order to balance the increased labor costs. Otherwise, profit margins must suffer.

Alexander Smith said, "In the wide arena of the world, failure and success are not accidents as we so frequently suppose, but the strictest justice. If you do your fair day's work, you are certain to get your fair day's wage—in praise or pudding, whichever happens to suit your taste."

The perplexing problem is, what constitutes a fair day's work? The starting point may lie in the direction of performance standards.

1μ

Electron micrograph shows unique particle structure of Micro-Cel T-38.

Maximum hide on your Morest Chart at lower costs with Micro-Cel T-38

Emulsion paint pigmentation costs can be reduced with Micro-Cel® T-38, Johns-Manville's new synthetic calcium silicate. Because of its unique properties, only 30-35 lbs. can replace up to 50 lbs. of TiO_2 pigment with no loss in hiding power. Cuts costs up to 10¢/gal. Micro-Cel's irregular particle structure and fine size also make it an ideal flatting agent for uniform reduction of angular sheen. For details, samples and technical assistance, mail in coupon!

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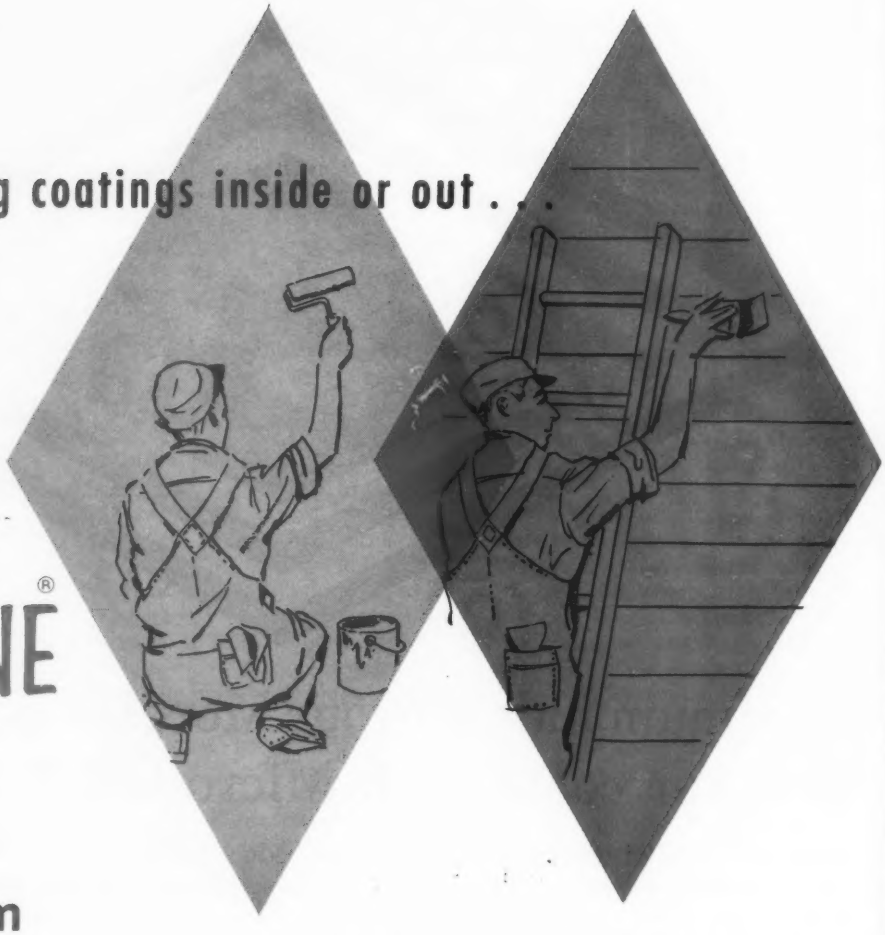

use

ASBESTINE® 525

"tailored" Magnesium Silicate!

Whether you make oil-base and/or water emulsion exterior formulations or interior paints such as alkyd or water emulsion flat, semi-gloss or low-sheen paints, you should know about ASBESTINE 525. Newest addition to our broad line, this outstanding extender offers paint chemists high flatting efficiency, high oil absorption and improved film integrity *in an intermediate price range.*

"Tailored" from high grade, "platey" ore by our unique precision milling process, ASBESTINE 525 is a chemically inert, stir-in pigment with excellent wetting and suspension properties and good white color. It produces tough paint films with good adhesion and improved sanding properties and is excellent for building thixotropy into formulations.

International Talc, world's largest producer of talc and leader in talc research, offers the paint industry an ASBESTINE grade perfect for every requirement. All are available for prompt delivery from ample stocks conveniently located throughout the U.S.A. and Canada. Money-saving combination shipments are available by combining our grades.

For samples and complete technical information on ASBESTINE 525 or other grades in our full and diversified line, contact us today.

ASBESTINE 525 Typical Physical Characteristics

Average Particle Size	5.2 microns
Hegman Fineness (obtained by hand mixing in linseed oil)	4-4½
Oil Absorption (Gardner-Coleman)	53-58
Water Absorption (cc's per 100 grams)	150-200
KU Range (Oil-base Paint Test Formula)	95-110

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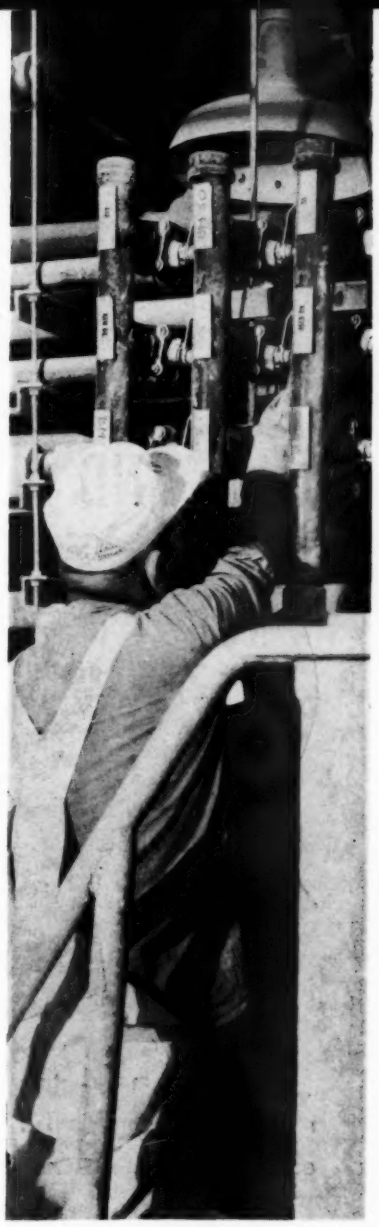
Ball Valve Manifold Controls Flow of Liquid Materials



Quarter turn of lever opens any one of 19 ball valves. Ingredient flows through manifold to measuring tank, then into mixing tank.

TWENTY-four of the large volume liquid ingredients used in the formulation of paints at the Melrose Park (Chicago) plant of Benjamin Moore & Co. pass through an ingenious system of 2″ and 3″ diameter piping (17,000 ft.). The ingredients are pumped from tanks to a number of mixing stations throughout the plant. The flow of ingredients from the piping system into the larger mixing tanks is controlled by 2″ Worcester ball valves installed in compact manifolds. Ball valves are used because only ¼ turn is required to operate a valve instead of the usual 5½ turns for a 2″ gate valve. The valves are operated by a lever rather than a hand-wheel. Twenty-four valves with levers are installed in a space 48″ x 35″. Valves are installed on 7″ centers which is the approximate minimum for 2″ pipe. The pipe system hangs from the ceiling and the manifold is supported by 2″ angles under each row of pipes. The bottom of the manifold is about 8½ ft. from the floor.

Two Measuring Systems

Two measuring systems are used with the manifolds. In one (Figure 1) the ingredients for a particular paint are passed through a Brodie meter. The number of gallons of oil, for example, is set on the meter, the ball valve controlling oil is turned on in the manifold, the oil runs until the correct amount has passed through the meter into the mixing tank. As the quantity approaches that set in the meter, the operator gets ready to shut off the ball valve with ¼ turn of the lever. The ingredients also pass through a de-aerator and strainer.

In the other method, the ingredients flow through the ball valves and manifold into measuring tanks (Figure 2). When the correct quantity has flowed into the tank, the ball valve is shut off and the

When ball valve is opened, ingredient flows through manifold, through strainer-de-aerator and through meter.

material from the measuring tank is released to the mixing vat.

Leakage Prevented

It is extremely important that two-way ball valves be used in the manifold. In an earlier design, one-way flow ball valves were used. There is pressure in the manifold when material is flowing and the valves backed off their seats. Leakage did take place. With two-way Worcester valves, leakage is prevented.

The system of pipes and manifolds makes it possible to make paint in larger batches more quickly.

The Worcester valves are of bronze with neoprene valve seats and packing. The piping is standard steel pipe. Valves are connected to the piping by threaded joints.

The valves, in service for 2 years, have not required any maintenance.

There are several other manifolds of the in-line type in the Benjamin Moore & Co. plant. This means the valves are in a straight line, 8 ft. or more off the floor, operated by long levers from the floor. This system was satisfactory when there were only 12 to 16 ingredients, but with 24 a more compact manifold is needed.

•

Swedes Largest Consumers Of Paint in Europe

Sweden is now Europe's leading consumer of paint per head of population, sales amounting to 30.8 pounds per year, according to C. E. Dahlqvist, head of the Swedish Paint Manufacturers Assn. In spite of the rainy summer of 1960, which made many postpone painting projects to a later date, sales were up considerably over 1959. Prospects for 1961 are favorable, following the high activity in the building, engineering, and wood-processing industries, which are large paint consumers, as well as the new agreement on the housing market, providing for increased repairs. Sales to do-it-yourself painters are also likely to increase. Though the paint industry is most countries is largely a home market one, Swedish exports have shown a slightly upward trend over the past few years.

get all the advantages of PVAc copolymer emulsions with CELANESE CL-204

Celanese CL-204 gives you an exceptional combination of properties for formulating better water-based paints. Its outstanding capacity for binding pigments at high pigment loading levels means lower production costs. Its superior film properties make CL-204 equally suitable for interior and exterior formulations —as well as for primer sealers. • With CL-204 film integrity, toughness, tint retention, sheen uniformity, borax compatibility, flow and leveling by brush and roller are all outstanding. As is mechanical and storage stability. • For complete details on Celanese CL-204—or other Celanese emulsions—please write, outlining your specific interest, to: Celanese Chemical Company, Dept. 587-G, 522 Fifth Ave., N. Y. 36.

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Celanese CHEMICALS

Now you can greatly increase warehouse space* at no increase in cost with...

AZODOX high apparent density zinc oxides

You can store AZODOX in much less warehouse space than required by other zinc oxides. Reason is, you get many more pounds of AZODOX per cubic foot of pigment, up to 65 lbs./cu. ft.! And smaller bags handle easier, faster—stack higher safely—reduce breakage losses—are shaped to give close-packed, unitized shipments.

In the manufacture of AZODOX, an exclusive process removes excess, space-wasting air from between individual particles of zinc oxide. That's all! Actual pigment density and all other desirable properties are unchanged. In comparison with other zinc oxides, high apparent density AZODOX flows freely yet dusts less, increases mixing capacity, disperses readily.

You can get high apparent density AZODOX in five grades of AZO brand lead-free paint pigments: acicular or nodular particle shape. For technical data, just fill in and mail this coupon.

*Pallet load of AZODOX on left above is 30.4 cu. ft. Pallet load of regular zinc oxide on right is 44 cu. ft. Same number of bags; same weight . . . *but a 30 percent saving in space!*

AMERICAN ZINC SALES COMPANY
1515 Paul Brown Bldg., St. Louis 1, Mo.

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- ☐ AZODOX high apparent density zinc oxides
- ☐ 15 types of AZO brand zinc oxides

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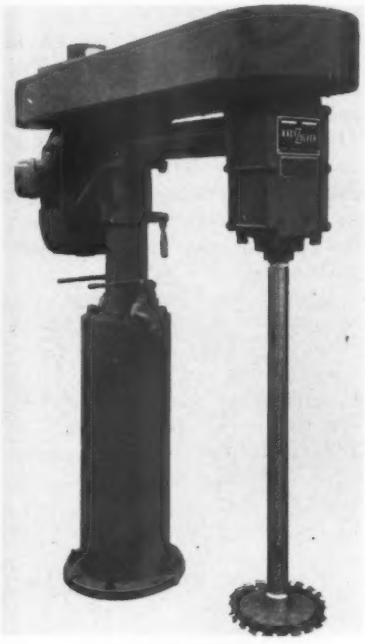
NEW EQUIPMENT AND MATERIALS

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.



KINETIC DISPERSION

VARIABLE SPEED MIXER
Hydraulic Control

New KDZ-100-B variable speed mixing machine features hydraulic control with speed and elevation control from a single station mounted on the central oil pedestal. A 2¼" stainless steel shaft with 16" bearing centers to give extreme rigidity of the shaft at all speeds. Forty-five inch blade elevation, 28" clearance at any point in a 360 degree arc around the central column. Bolt together design and hydraulic elevating mechanism reportedly allows replacing any part of the unit in the field. Rotational locking is accomplished by a unique means which eliminates exterior steadying pipes which interfere with tanks placed around the unit. The machine is built to utilize motors from 10-25 Horsepower. The impeller is also stainless steel and is a special Kady design to deagglomerate, emulsify and disperse at fast production rates in larger tanks than normally used with such equipment.

Kinetic Dispersion Corp., Dept. PVP, Buffalo, N. Y.

GEL TIME MEASURE
Unique Circuit

New instrument which automatically measures the gel time of thermo-setting resins has been introduced.

The meter features a unique electronic circuit which accurately measures and records gel time regardless of the initial viscosity of the resin. This is accomplished through the automatic raising and lowering of a weight into the resin sample until the liquid gels sufficiently to stop the action.

AMERICAN PETROCHEMICAL

After a test is started, the operator can leave the sample unattended. When the gel time is reached the unit stops automatically, records the time and signals the completion of the test.

Meter will handle all chemical types, including polyesters, epoxies, polyurethanes, silicones, polysulfides, ureas, melamines and phenolics. It can be used on such widely different products as adhesives, casting resins, gel coats, foam resins and casting resins.

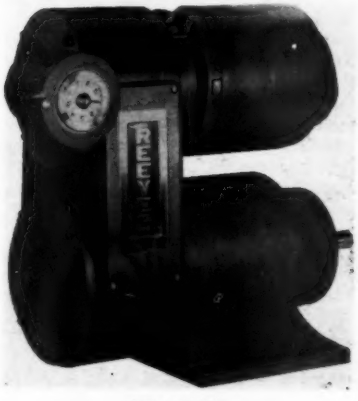
Multiple installation of the instruments makes possible the determination of many gel times simultaneously. Disposable sample containers and weights eliminate the need for cleaning between tests.

Mol-Rez Div., **American Petrochemical Corp.,** Dept. PVP, 3134 California St., N. E., Minneapolis 18, Minn.

VARIABLE SPEED DRIVE
4:1 Speed Ratio

New motorized variable speed drive, complete with single, double or triple stage gearing, provides speed ratios up to 4:1 and output speeds from 2630 RPM to 25 RPM. This motodrive is now available for 25 Hp. through 40 Hp. ratings.

The size 600 motodrive is versatile, providing over 100 different standard assemblies. Vertical, horizontal and 45° assemblies are available in wall or ceiling mountings at



RELIANCE

no extra charge. In addition, trunnion mounted vertical, horizontal 45° assemblies are offered as standard in no reducer and single reducer units. Either "C" flow or "Z" flow output shaft arrangement is standard for all assemblies. "Scoop" mountings to meet J.I.C. standards and NEMA "D" output flange mountings are also available.

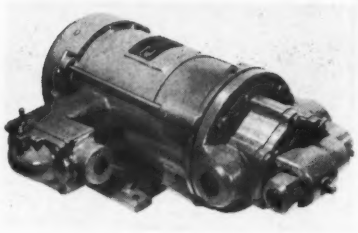
Magnetic brakes up to 230 ft. lbs. capacity are available on the size 600 unit.

Reliance Electric & Engineering Co., Dept. PVP, Cleveland 17, Ohio.

ROTARY PUMPS
Easy Installation

New series of motor-mounted rotary pumps for handling clean liquids and solvents (up to 5000 SSU) is announced. These versatile pumps offer new economy and ease of installation on jobs requiring delivery rates from 10 to 30 gpm at pressures up to 125 psi.

In this compact design the pump and motor are built as an integral unit with a common heavy-duty shaft supported by the motor bearings. Because the pump is mounted directly to the motor, there is no need for separate pump bearings, no need for a second seal, a coupling, a pump head, or a mounting base. Installation is fast and easy because



BLACKMER

there is no shaft coupling to cause misalignment, and the pump discharge can be directed to left, right, up or down simply by removing four capscrews and repositioning the cylinder.

Company's motor-mounted pumps are offered in three basic sizes, 1" 1¼" and 1½" (designated as MX1, MX1¼, and MX-1½). A second series (designated as MXS1, etc.) is fitted with special composition vanes to handle a variety of commercial solvents. Each pump size may be ordered with any of five different motors, ranging from ¾ to 3 hp. The motors are all of the explosion-proof type, listed by Underwriters' Laboratories, and rated for continuous duty. Sizes ¾, 1 and 1½ are wound for single-phase, 115-220 volt power and are equipped with thermal overload and stop-start switch; while the 2 and 3 hp models are three-phrase, 220-440 volt. All are 60-cycle, 1800 rpm.

Blackmer Pump Co., Dept. PVP, Grand Rapids, Mich.

LIQUID TRANSFER
Flange Coupling

The C-L coupling was designed as a device for connecting and disconnecting, by means of quick-acting cams, cargo and other liquid transfer lines in industrial service. The design effort was concentrated on a means by which to reduce the time and hazards of the make-and-break method of hose connections by the conventional nut-and-bolt technique. An hour is required to attach two flanges by the nut-and-bolt method. If the time to make the connection could be reduced to seconds, the hazards involved would become almost negligible.

In the nut-and-bolt method, the two flanges are brought together, drift pins are inserted through

maining bolts are inserted. If this were the procedure followed exactly in every case, there would be relatively little danger. What actually occurs is different. The drift pins do not set the bolt holes of the flanges exactly in line, so a finger goes in to line them up perfectly. All too frequently, the drift pin loosens, falls out and the connecting flange, of considerable weight, turns just enough to jam and can sever the finger. On occasion, the hose is twisted and, because of the time it takes to insert each bolt, breaks loose. Falling on a toe, it causes injury. Tests showed that it took four men 2 hours each to connect four standard flanges using nuts and bolts. It took two men 10 minutes each for four C-L coupling connections.

The coupling uses cams as the locking mechanism. These cams are permanently attached to one of the two flanges to be connected. As the two flanges are brought together, the second flange rests inside the cams. This feature acts to "anchor" the flange after it "finds" the flange, much in the manner a catcher's mitt "finds" a baseball, until the cams are set. Because the flange is thus "pocketed," this prevents injury to the toes and feet of personnel during the maneurvering process. There is no "jockeying" of flanges and no twisting to line up bolt holes.

An additional safety feature is a permanently positioned "O"-ring gasket. The "O"-ring gasket is part of the coupling. No additional gaskets have to be provided to establish a leak-proof seal, so no fingers are placed between heavy flanges. By eliminating such hazards as crushed fingers, smashed toes and severed finger-tips, insurance claim involvements are reduced to a minimum, with consequent cost advantages.

Camlock Flange Sales Corp., Dept. PVP, 39 Redfern Ave., Inwood 96, L. I., N. Y.

PLASTICIZER
Colorless

More aggressive tack, improved quick-tack time and high-strength

short adhesive "legs" are features of a new plasticizer and tackifier for polyvinyl acetate emulsions.

The new product is a polyoxyethylated aromatic colorless liquid. It normally is employed on the basis of 10 to 15 percent of the amount of the polyvinyl acetate emulsion, depending upon the emulsion's specific weight.

It has been noted that its use conjunction with or as a partial replacement for the normal plasticizer, increases ultimate bond strength of adhesive formulations.

Nopco Chemical Co., Dept. PVP, 60 Park Pl., Newark 1, N. J.

RESIN LATEX
Alcohol-Resistant

A self-crosslinking resin latex that offers unusual formulating and end-property advantages as a pigment binder for wallpaper coverings has been developed. Color coatings based on the latex show high resistance to staining, alcohol, and water.

Introduced as X-Link 2833, this new vinyl-acrylic copolymer dispersion is capable of crosslinking without the addition of thermosetting resins—in contrast to conventional thermoplastics—to form unusually strong and flexible films having exceptional resistance to water, solvents, and creep. Use of the latex has been found to eliminate problems of stability, odor, compatability, and high curing temperatures usually associated with combinations of thermosetting and thermoplastic resins.

Other promising application areas for X-Link 2833 include non-woven fabrics, paper saturation, vinyl organosol tie coats, adhesives, awning coatings and textile finishes.

National Starch and Chemical Corp., Dept. PVP, 750 3rd Ave., New York 17, N. Y.

DECAL ENAMELS
Good Adhesion

Another field in low-cost screen process printing has been opened by dual purpose decal enamels. The enamels (10-000 Series) have been specifically developed for large face-down decal production and for direct printing on many different types of surfaces, which have been found difficult to imprint with ordinary screen process materials.

The enamels feature exceptional strength, durability, and adhesion. Their superiority has been proved in test and production use with most plastics, as well as baked enamel surfaces and metals including polished aluminum foil. For example, aircraft, electronics, and automotive manufacturers have found products ideal for instrument panels, dials, nameplates and chassis markings.

Wornow Process Paint, Dept. PVP, 1218 Long Beach Ave., Los Angeles 21, Calif.

INDUSTRIAL TOWELS
Reusable

Now being marketed nationally, "Kimtowels" are said to be the first heavy duty paper show towel designed to be reusable. This is an important factor, the company points out, since in the past many industrial people have argued that the value of disposable towels is limited by their short life.

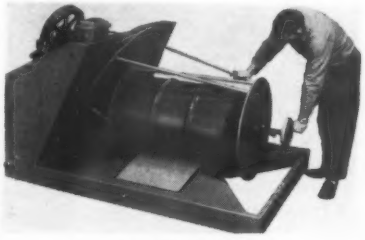
The new shop towel is said to be lint free and to have high tensile strength and quick absorbency. Tested in operations ranging from railroad locomotive shops to multiple spindle screw machine houses, it is recommended for wiping bearings, cleaning gears, polishing gauges, soaking up oil spillage and most other applications for which cloth towels are used.

Saturated with solvent, it also

may be used to clean machine tools or to pick up chips and shavings. Unlike cloth towels, which may often retain dangerous chips and shavings even after laundering, the Kimtowel may be discarded after cleaning jobs of this nature.

Costing approximately one cent each and shipped in packages of 50, the disposable towels have a quarter fold and when unfolded are 13 by 15 inches in size. Special metal dispensers are available and can be locked to prevent pilferage, often experienced with rags and conventional laundered towels.

Kimberly-Clark Corp., Industrial Products Div., Dept. PVP, Neenah, Wisc.



NATIONAL

MIXER
No Evaporation

New mixer for mixing materials in 55 gallon drums weighing up to 1,000 lbs., developed for the paint industry, uses a patented rotary oscillating motion that according to the company has been successfully tested on sound deadener, glazing compound, abrasives, plastics and other difficult materials. Paint that previously required five hours for complete pigment dispersal using a paddle mixer, is now mixed in 20-30 minutes by a Model 2155 tested for over a year by a nationally known paint manufacturer. The company offers a money back guarantee that the new mixer will mix or blend materials in one half the time required by present methods.

Material is mixed in its original container with no need to remove the cover with the result that there is no chance for the entrance of foreign materials, no irritating odors or explosive vapors can escape, there is no evaporation and nothing to clean. The drum rotates at only 30 rpm and no vibration is used so the mixer sets free on the floor. Once 220/440 Volt, 3 phase, 60 cycle electrical connections are made the machine is ready for use.

National Industries, Dept. PVP, 1169 Lewis St., Jackson, Mich.

GLOSS CONTROLLER
Free-Flowing Paste

New gloss controller for polyurethane varnishes, "*ure*-Phlat," has been perfected and is now being sold. Product is the result of a unique method of dispersing a finely-divided silica in a polyurethane vehicle. As supplied by the manufacturer in bulk form, it is a stable, free-flowing paste which, when added to clear varnish, gives a rubbed effect. This finish will not polish under any conditions. It has no effect on the water and mar-resistance qualities that are inherent in polyurethane varnishes. It will eliminate the problems of settling, seeding, and non-uniformity in satin finish varnish formulation. In addition, by using the gloss controller the manufacturer eliminates the need for grinding his own flatting base.

LoBo Chemical Products Co., Dept. PVP, Bedford, Ohio.

On the fringe of the ARCTIC 700 miles deep in the Canadian wilderness, Lake Trout, Salmon Trout, Arctic Grayling, Big Northerns and Walleyes all abound in unbelievable numbers.

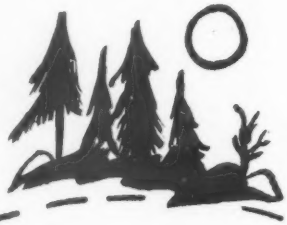
Carved from the Canadian wilderness by the Arctic Argonauts here, on Reindeer Lake, Saskatchewan, is a modern fishing and hunting camp complete with airstrip. Arctic Lodge's twin motored DC 3 charter planes will fly your customers and executives directly to the camp with only one stop for customs and gas.

IN THE LAND OF THE CARIBOU

Top sportsmen, writers and experienced fishermen acknowledge Reindeer Lake to be the finest fishing spot in Canada. Picked as Number 1 by the United States Rubber Co. for its million dollar fishing vacation contest, Arctic Lodge was also heralded by Argosy Magazine in 1959 and '60 as tops for fishing thrills.

The Management, with years of experience, can guarantee clean and comfortable accommodations with hot and cold running water. In the Food Department, we have gone all out to insure the best. Trained native guides, one to every two guests, will accommodate your every wish. Big safe boats, best suited for comfortable and dependable operation are powered by heavy duty Johnson motors with two guests per boat maximum load.

Phone or write for our twenty-five minute 16 mm sound and color film which is available at no cost. Brochure and further information supplied immediately upon request.



Write to:
Arctic Lodges, Ltd.
3402 University, S. E.
Minneapolis 14, Minn.
Phone FE 8-1583

Arctic Lodge

"ON THE FRINGE OF THE ARCTIC CIRCLE"

REINDEER LAKE, SASKATCHEWAN, CANADA

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Pigmented Aqueous Resin Lacquers

U. S. Patent 2,986,542. Luzius Schibler, Riehen, and Hans R. Zbinden and Hans U. Gassmann, Basel, Switzerland, assignors to Ciba Limited, Basel, Switzerland.

An hydrous pigmented artificial resin lacquer that is easily dispersible in an aqueous medium, which lacquer consists of a dispersion of (1) an inorganic pigment in a resin lacquer consisting substantially of (2) at least one organic solvent of at most limited miscibility with water and of (3) a hardenable water-insoluble etherified methylol compound selected from the group consisting of (*a*) a methylol-urea in which at least one methylol group is etherified with a monohydric alcohol having 3 to 8 carbon atoms, (*b*) a methylol-melamine in which at least one methylol group is etherified with a monohydric alcohol having 3 to 8 carbon atoms, (*c*) a methylol-benzoguanamine in which at least one methylol group is etherified with a monohydric alcohol having 3 to 8 carbon atoms, and (*d*) a methylol-melamine in which at least one methylol group is etherified with a monohydric alcohol having 1 to 4 carbon atoms and in which at least one other methylol group is esterified with a fatty acid having 9 to 22 carbon atoms, and (4) an emulsifying agent which is soluble in the lacquer and in water and which is a condensation product of one mol of a water-insoluble organic hydroxyl compound of the formula R—OH, wherein R represents a hydrocarbon radical having from 8 to 24 carbon atoms, with 8 to 100 mols of ethylene oxide, the amount of compound (1) ranging from 25 to 50 parts by weight, the amount of component (2) ranging from 15 to 45 parts by weight, the amount of component (3) ranging from 10 to 30 parts by weight and the amount of component (4) ranging from 6 to 20 parts by weight.

Paint Latices from Super Bodied Oils

U. S. Patent 2,978,346. Charles E. Penoyer, Burton, Ohio, assignor to The Sherwin-Williams Co., Cleveland, Ohio, a Corp. of Ohio.

An oil-in-water emulsion which comprises a vacuum and heat bodied linseed oil, free from gel particles having a viscosity of greater than 50 minutes but less than 75 minutes, said bodied oil reduced with a volatile organic solvent comprising a minor amount of an oxyalkylated monoalcohol, said monoalcohol containing from 1 to 3 carbon atoms and a major amount of a volatile hydrocarbon solvent to not less than 80% non-volatile content as the disperse phase and a continuous aqueous phase comprising water, from 1 to 5% by weight of the disperse phase of a non-ionic emulsifying agent having an HN between 39 and 43 and 6 to 10% by weight of said oil of an alkali metal salt of a polymerized drying oil fatty acid containing principally dimers and trimers thereof, said emulsion containing an alkali metal phosphate in a quantity sufficient to impose a pH of between 8.0 and 9.5 and the quantity of the disperse oil phase of the order of 40 to 60% by weight of the total product.

Polymeric Sanitary Coating System

U. S. Patent 2,985,600. Naaman F. Barr, Pine Township, Allegheny County, and Frank G. Alster, Baldwin, Pa., assignors to American Marietta Co., Stoner-Mudge Co., Div., Chicago, Ill., a Corp. of Ill.

A method for producing a resinoid adapted for use as a sanitary can coating comprising (1) reacting a material slected from the group consisting of unsaturated drying oils having at least two double bonds in a fatty acid radical thereof, fatty acids derived from said drying oils and mixtures thereof, with from 20 to 67% by weight of dihydric

phenolic compound selected from the group consisting of trifunctional and tetrafunctional mononuclear phenols containing two phenolic hydroxyl groups and trifunctional and tetrafunctional dinuclear phenolic compounds in which two monohydric phenolic groups are linked together through an intervening divalent alkyl group based on the combined weight of said material and said phenolic compound, at a temperature from 250 to 525° F., until the two reactants are completely compatible, as evidenced by lack of crystallization and clouding of a supercooled bead sampled therefrom (2) reacting the reaction product of reaction (1) with monomeric formaldehyde in proportions of 0.8 to 1.5 moles of monomeric formaldehyde for each mole of phenolic compound in the reaction product of reaction (1), at substantially 170 to 200° F. for at least 20 minutes, and (3) dehydrating the resin produced by reaction (2).

Preparing Styrenated Nondrying and/or Semi-Drying Oil Modified Alkyd Resins

U. S. Patent 2,986,543. John H. Daniel, Jr., Old Greenwich, Conn., assignor to American Cyanamid Co., New York, N. Y., a Corp. of Me.

A process for the preparation of styrenated alkyd resin comprising the steps of adding an organic peroxide olymerization catalyst and a polymerizable styrene consisting essentially of a member selected from the group consisting of styrene, a nuclear substituted methyl styrene and a nuclear substituted halo styrene, in an amount varying between about 0.28% and 1.1% by weight, based on the total weight of styrene compound to be added, per minute for a period of time between about 1½ hours and 6 hours, to an oil material selected from the group consisting of non-drying glyceride oils, semi-drying glyceride oils and the fatty acids of said glyceride oils while maintaining the temperature of said oil material at a temperature of at least 140° C., heating the mixture of said oil material, catalyst and styrene compound after the addition of said styrene compound has been completed until substantially complete polymerization has taken place, thereafter adding a polyhydric alcohol having at least 3 hydroxy groups and a polycarboxylic acid free from non-benzenoid unsaturation and heating the entire mixture until substantially complete esterification has been accomplished as is indicated by an acid number of less than 20, wherein said glyceride oils and their fatty acids contain no significant measure of conjugated unsaturation, wherein the amount of polycarboxylic acid free of non-benzenoid unsaturation added varies bet een about 20% and 50% by weight, based on the total calculated weight of the oil-modified alkyd resin excluding the styrene compound; wherein said polyhydric alcohol is charged in an amount varying between the stoichiometrical amount required to completely esterify all carboxyl groups present in the system and 20% in excess of said stoichiometrical amount; wherein the total amount of said styrene utilized is between about 10% and 70% by weight based on the total weight of said styrenated alkyd resin and wherein the total amount of said oil material utilized is between about 10% and 70% by weight based on the total weight of said styrenated alkyd resin.

Modification of Alkyd Resins with 4-Biphenyl Benzoic Acid

U. S. Patent 2,982,747. Raymond L. Heinrich, Baytown, Tex., and David A. Berry and Richard J. Dick, Columbus, Ohio, assignors, by direct and mesne assignments, to Esso Research and Engineering Co., Elizabeth, N. J., a Corp. of Dela.

An alkyd resin composition comprising the intercondensation product of about 3.1 to about 3.4 mol equivalents of a polyol containing an average of from about 2.5 to 4.5 hydroxyl groups per molecule with from about 2 to 2.5 mol equivalents of a polycarboxylic acid and, correspondingly, from about 1 to about 0.5 mol equivalents of a modifier component consisting of about 30 to 60 mol percent of an unsaturated glyceride oil fatty acids portion and, correspondingly, about 70 to 40 mol percent of an aromatic monocarboxylic acid component containing from about 40 to 100 mol percent of 4-biphenyl carboxylic acid.

Alkyd Resin Utilizing Trimellitic Anhydride and Tall Oil

U. S. Patent 2,985,603. Richard E. Van Strien, Griffith, and Benjamin A. Bolton, Cary, Ind., assignors to Standard Oil Co., Chicago, Ill., a Corp. of Ind.

A very long oil length alkyd resin reaction product of (A), (i) a polyhydric alcohol containing at least three hydroxyl groups, (ii) tall oil fatty acids and (iii) rosin, said rosin being present in an amount between rosin, said rosin being present in an amount between about 15 and 100 weight percent based on said tall oil fatty acids, said alcohol being charged in an amount between about 5 to 20 mole percent in excess of the theoretical requirement to form the ester product of reactants (i), (ii) and (iii), and (B) an acidic material selected from the class consisting of trimellitic acid, trimesic acid, hemimellitic acid, trimellitic anhydride, and hemimellitic anhydride, said acidic material being charged in an amount between about 1.4 and 3 parts by weight per part of said alcohol charged, the ester product of step A and said acidic member being condensation reacted with continuous removal of water at a temperature between about 180°C. and 285° C. until the acid number of the resin reaction product is between about 2 and 15, said resin reaction product being further characterized by an oil-length in excess of about 77%.

Modification of Alkyd Resin Compositions with Meta-Bromo Benzoic Acids

U. S. Patent 2,982,748. Raymond L. Heinrich, Baytown, Tex., and David A. Berry and Richard J. Dick, Columbus, Ohio, assignors, by direct and mesne assignments, to Esso Research and Engineering Co., Elizabeth, N. J., a Corp. of Dela.

An alkyd resin composition comprising the intercondensation product of about 3.1 to about 3.4 mol equivalents of a polyol containing an average of from about 2.5 to 4.5 hydroxyl groups per molecule with from about 2 to 2.5 mol equivalents of a polycarboxylic acid and, correspondingly, from about 1 to about 0.5 mol equivalents of a modifier portion consisting of about 35 to 45 mol percent of an unsaturated glyceride oil fatty acids portion and, correspondingly, about 65 to 55 mol percent of m-bromobenzoic acid.

Wax Coating Composition

U. S. Patent 2,985,538. John W. Padgett, Round Top Road, Bernardsville, and Sherman T. Van Esselstyn, 55 Locust Dr., Morris Plains, N. J.

A wax composition consisting essentially of a mixture of three hydrocarbon constituents, the first of which consists of about 65-85% by weight of a non-straight chain paraffinic wax and has an average molecular weight in the range of about 550-750, a Saybolt Universal viscosity at 210° F. of about 80-120 seconds, an oil content of up to about 150° F. to about 180° F.; the second of said constituents being comprised of about 50-95% by weight of a straight chain paraffinic wax and containing about 5-50% by weight of a non-straight chain paraffinic wax material and having an average molecular weight in the range of about 400-550, a Saybolt Universal viscosity at 180° F. of about 45-65 seconds, an oil content of up to about 2.0%, and a melting point by cooling curve of from about 145° F. to about 165° F.; and the third of said constituents consisting of at least about 90% by weight of a straight-chain paraffinic wax and having an average molecular weight in the range of about 290-340, a Saybolt Universal viscosity at 180° F. of about 37-41 seconds, an oil content of up to about 0.5%, and a melting point by cooling curve of from about 115° F. to about 135° F.; the ratio by weight of the first constituent to the second constituent being within the range of 1:5 to 3:1 and the ratio of the combined weights of the first and second constituents to the third constituent being within the range of 1:5 to 2:1.

Styrenated Oil-Modified Alkyd Resins

U. S. Patent 2,982,746. William Frederick Hart, Bridgeville, Pa., assignor to American Cyanamid Co., New York, N. Y., a Corp. of Me.

A process comprising heating and polymerizing a polymerizable styrene in the presence of a material selected from the group consisting of drying glyceride

oils, semi-drying glyceride oils, their glyceride fatty acids and their monoglycerides, and a polymerization catalyst until polymerization is substantially complete, adding a saturated aliphatic polyhydric alcohol having a hydroxy average functionality greate. than 2 and heat reacting to an acid number below 20, adding thereto molten phthalic anhydride while holding the charge at a temperature between about 220°C. and 240°C. and continuing the heating after the molten phthalic anhydride addition has been completed to a temperature of about 260° C. and 280° C. until an acid number between about 5 and 20 is reached.

Catalyzed Urea Coating

U. S. Patent 2,982,745. Norman I. Gaynes, 1254 Hedin Pl., Rahway, N. J.

A coating composition capable of forming a rapidly air drying film, consisting substantially of about 40% of an alkyd resin derived from dehydrated castor oil, about 40% of an amino urea-formaldehyde resin, about 0.60% of an ethyl acid phosphate, about 9.7% butanol, and about 9.7% xylol, to produce a fully balanced integrated coating composition which will withstand lengthy storage in the liquid state without deterioration of the composition, and which, after application, will show no loss of gloss, hardness, toughness chemical resisting properties, color retention or weatherability as compared with a film formed with a freshly manufactured composition.

Paint Vehicle with Fungicidal Properties

U. S. Patent 2,984,632. Leo A. Goldblatt and Lucien L. Hopper, Jr., New Orleans, La., assignors to the United States of America as represented by the Sec. of Agriculture.

A fungicidal paint and varnish comprising, as the film-forming components thereof, the composition obtained by heating together a member of the group consisting of a drying oil, drying oil fatty acids, and mixtures thereof, hexachlorocyclopentadiene, and a film-forming resin containing hydroxyl groups reactive with the acid groups of said member of the group consisting of a drying oil, drying oil fatty acids, and mixtures thereof.

Dehydration of Pentaerythritol Esters

U. S. Patent 2,985,601. William M. Kraft, Verona, N. J., assignor to Heyden Newport Chemical Corp., a Corp. of Dela.

The method of producing pentaerythritol reaction products which comprises the steps of heating and esterifying pentaerythritol with 1 to 2 moles per mole of pentaerythritol of a monocarboxylic acid selected from the group consisting of fatty acids containing 6 to 18 carbon atoms, benzoic acid, and mixtures thereof at a temperature between approximately 150° C. and 230° C. to remove 1 mole of water of esterification per mole of acid and heating and dehydrating the partially esterified pentaerythritol at a temperature between approximately 150° C. and 230° C. in the presence of an acid dehydration catalyst to remove from 0.4 to 0.8 mole of water of dehydration per mole of pentaerythritol thereby forming a partially esterified dipentaerythritol-containing pentaerythritol reaction product.

Weather Resistant, Fire Retardant Paint Containing Chlorine-Containing Organic Polymer, and a Spumific

U. S. Patent 2,984,640. Benjamin B. Kaplan, West Hartford, Conn., assignor to Albi Manufacturing Co., Inc., Rockville, Conn., a Corp. of Conn.

A weather-resistant fire-retardant paint free from water-soluble ingredients comprising a film-forming, chlorine-containing organic polymer of an ethylenically unsaturated monomer which polymer liberates hydrogen chloride upon exposure to an elevated temperature from 125° to 400° C., a saturated open chain polyhydroxy alcohol containing from 5 to 15 carbon atoms and from 4 to 8 hydroxyl groups, a hydrocarbon solvent, and a member of the class consisting of dicyandiamide and melamine pyrophosphate.

HET® ACID BECOMES PART OF YOUR PAINT FOR UNIFORM FIRE RETARDANCE...

not just an additive

Het Acid puts 54% stable chlorine in paint alkyds—for permanent fire retardance.

Het Acid is not an additive. It combines chemically with the alkyd resin to form a permanently uniform structure. Alkyds made with Het Acid are fire retardant and have a good combination of other desirable properties as well.

Assaying 99.5%, Het Acid comes to you as fine white crystals. Highly soluble, it permits the formulation of resins without requiring an alcoholysis step. Het Acid reacts easily with polyols and fatty oils, fatty acids or monoglycerides to form oil-modified alkyds.

With these advantages, Het Acid can give you that extra quality for increased paint sales. Our Het Acid Bulletin is yours for the asking, as are data sheets on other Hooker products for the paint industry.

OTHER HOOKER CHEMICALS FOR THE PAINT INDUSTRY

Alkyl Acid Phosphates—for hardening resins

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Chlorinated Paraffin (40% Cl_2)—used in a variety of paints, enamels and stains

MPS® 500 (methyl pentachlorostearate—36% Cl_2)—a secondary plasticizer

Niagathal® (tetrachlorophthalic anhydride—49.6% stable chlorine)—a fire-retardant intermediate for alkyds and polyesters

Trichlorethylene—a nonflammable solvent for paints used in closed-system coating processes

Triphenyl Phosphite—to improve color and clarity in alkyds; also used in plasticizer applications

Tetrapotassium Pyrophosphate—for pigment dispersion and emulsion stabilization

Phenolic Resins—several resins for coatings which are highly resistant to acids, alkalies, gas fumes, and strong solvents

Caustic Soda, Caustic Potash and Carbonate of Potash—in many grades and forms

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Name..... Title.....

Company..... Address.....

City..... Zone..... State.....

TECHNICAL Bulletins

REACTIVE COMPOUND

Typical chemical reactions of hexachlorocyclopentadiene are featured in a new technical bulletin.

C-56 is the registered trademark for this highly reactive compound. Among end products derived from C-56 are non-flammable resins and chemical intermediates having potential application as dyes and resins for paints.

In addition to the typical reaction products illustrated by their structural formulas, the publication covers physical data on C-56 toxicity, and recommendations for handling the product.

Hooker Chemical Corp., Dept. Niagara Falls, N. Y.

SILICONE COATINGS

New brochure describes how Syl-off silicone coatings impart non-sticking or release characteristics to a variety of package liners, processing papers, interleaving and slip sheets. Booklet describes how manufacturers, packagers and users of sticky products save time and money because Syl-off coated papers mean faster processing, less mess, less waste. Included in this new brochure are samples of Syl-off coated paper plus a complete listing of approved sources for coated kraft, parchment, glassine—flat or corrugated board, boxes, cartons, unit containers and multiwall bags—interleaving papers and slip sheets.

Dow Corning Corp., Dept. PVP, Midland, Mich.

SOLVENTS

Newly revised solvent folder has been published. This handy file-type folder presents product specifications in comparative form. In addition to typical specifications including distillation ranges, charts present relative time of evaporation. Information is present on solvent selection. There is also a brief description of aliphatic naphthas, paraffinic hydrocarbons, odorless solvents and also aromatic and intermediate hydrocarbon solvents.

American Mineral Spirits Co., Dept. PVP, Murray Hill, N. J.

ORGANIC SOLVENTS

A comprehensive, new two-color chart that provides a comparison of the physical properties of over 200 commercially available common organic solvents is now available.

Chart includes definitions of terminology used and technical data on physical properties based on producers' current specifications and a detailed breakdown of the physical properties found in organic solvents.

The Solvents & Chemical Group, Dept. PVP, 2540 W. Flournoy St., Chicago 12, Ill.

ALDEHYDES

New methodology for continuous, automatic analysis of aldehydes is outlined in a two-page data sheet.

The procedure uses Schiff's Reagent of the stabilized type. The method was developed for aldehydes in the range of 0-1%, but elimination of some of the dilution factors will permit the analysis of trace levels.

Flow diagram shows each step of the automated analysis, and integration of the separate steps into a continuous flow. Semi-log plot and actual chart recording are included.

Technican Controls, Inc., Dept. PVP, Chauncey, N. Y.

From CIBA Research . . .

New Epoxies Serve Your Search For Greater Markets

CIBA
First in Epoxies

The uses for epoxy coatings grow and grow. So does the product and application development at CIBA, a pioneer in the development of epoxy resins. With the recent introduction of the CIBA Araldite® Epoxy Resins "7000" series, also available in convenient solution form, paint formulators have become assured of dependable and consistently high batch to batch results every time. The "7000" series (see below) result in better wetting finishes with better all-around coating properties and versatility for formulating.

These newest CIBA Epoxy products are another example of a continuing program aimed at bringing products specifically designed for the coatings market.

For further information on these and other new products of CIBA write:

CIBA Products Corporation, Fair Lawn, New Jersey.

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"7000" Series	471 X	75	Z3-Z5	●	●	
"7000" Series	485 E	50	X-Z			●
"7000" Series	497 C	55	Z3-Z5			●
	540 X	90	Z4-Z6		▲	
	545 BX	60	Y-Z2	▲		
	571 CX	80	Z5-Z7	▲		
	571 K	70	W-Z	▲		
	571 KX	75	Z1-Z4	▲		
	571 T	75	Z2-Z4	▲		
	597 ET	55	Z1-Z4			▲

Solvent code: B = butyl Cellosolve, C = Cellosolve, E = Cellosolve acetate, H = Cyclohexanone, K = MIBK, T = toluene, X = xylene

CIBA

PAINT BLISTERING

(*From page 37*)

usual: mildly (wet) sandblasting, standard paint system, fresh water immersion test.

After 30 days the usual Dia Phenomenon on the back of the masked bare sports has appeared, but at the back of the scratches it is dubious.

The blister development in this case is rather slow. The preferential development of blisters along the scratches, and along the wider bare spots and their Dia sides can be very clearly seen in Fig. 12 and 13. By incorrect masking, in some cases, a few mm of topcoat is present only along the bare spot.

Here the blistering is very strong not at the very edge of the bare spot but where the two coats are both present, perhaps because the general permeability of the topcoat is larger so that no osmotic pressure can build up or maybe the local potential under the primer is more cathodic.

Acknowledgement

This paper was presented at the Fifth F.A.T.I.P.E.C. Congress in Italy,

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2. G. A. Nelson and R. T. Effinger. Blistering and Embrittlement of Pressure Vessel Steels by Hydrogen. Welding Research Supplement (Jan. 1955, p. 12-S).

Details on panel preparation, paint systems, etc.

Fig. 2

Panel No. 5595. Front i.e. scratched side. (Dia side see Fig. 3)
Panel: Cold-rolled Steel, 0.1 x 9 x 14 cm.
Pretreatment: Mildly (wet) Sandblasting.
Paint System: Standard Paint Systems
Bare Spots: Scratched (bottom first) after 0, 1, 3, 5, 9 (right side only), 16, (with fork), 23, 25, 30, 37, 51 and 64 days of testing.
Picture taken After 78 days of testing.

Fig. 3

Panel No. 5595. Dia Side. (Front side see Fig. 2) Details: See Fig. 2.

Fig. 4

Panel No. 8242/1. Front i.e. scratched side. (Dia side see Fig. 5. Partly stripped panel see Fig. 6a)
Panel Cold-rolled Steel, 0.1 x 9 x 14 cm.
Pretreatment: Mildly (wet) Sandblasting.
Paint System: Standard Paint System
Bare Spots: Scratched (bottom first) after 0, 1, 5, 7, 37 days of testing.
Test: Fresh Water Immersion Test.
Picture taken: After 78 days of testing.

Fig. 5

Panel No. 8242/1. Dia side. (Front side see Fig. 4. Partly stripped see Fig. 6b) Details: See Fig. 4.

Fig. 6a

Panel No. 8242/1, one half stripped. (unstripped panel Fig. 4) Scratched side. Detail: See Fig. 4.

Fig. 6b

Panel No. 8242/1, one half stripped. (unstripped panel Fig. 5) Dia side. Details: See Fig. 4.

Fig. 8a

Panel No. 152 Front i.e. scratched side. For later stage of blistering see Fig. 8b. (Dia side, in later stage however, see Fig. 9)
Panel: Two steel sheets, hot-rolled, final thickness 1 mm.
Panel dimensions: 0.1 x 9 14 cm.
Pretreatment: Mildly (wet) Sandblasting.
Paint System: Standard Paint System.
Bare Spots: By tape-masking and scratching before testing.
Test: Fresh Water Immersion Test
Picture taken: After 20 days of testing.

Fig. 9

Details: See Fig. 8a

Fig. 10

Panel No. 154. Dia side. (Front side similar Fig. 8b.)
The Copper interlayer prevents the Passage of Atomic Hydrogen.
Panel with interlayer of 0.05 mm copper, for the rest similar to Panel No. 152. (Fig. 8b.) Picture taken: After 41 days of testing.

Fig. 11

Panel No. 157. Dia side. (Front side similar to Fig. 8b)
Panel with Interlayer of 0.15 mm chromium steel (18% Cr), for the rest similar to Panel No. 152. (Fig. 8b.) Picture taken: After 41 days of testing.

Fig. 12

Panel No. 10500. Front side (Dia side see Fig. 13.)
Panel: Cold-rolled steel, 0.1 x 9 x 14 cm.
Pretreatment: Mildly (wet) Sandblasted, Preheated during 4 hours at 180°C.
Paint System: Standard Paint System
Bare Spots: By tape-masking and scratching before testing.
Test: Fresh Water Immersion Test
Picture taken: After 30 days of testing.

Fig. 13

Panel No. 10500. Dia side (Front side see Fig. 13).
Details: See Fig. 12.

Fig. 12. Viscotester for quick determination of viscosity.

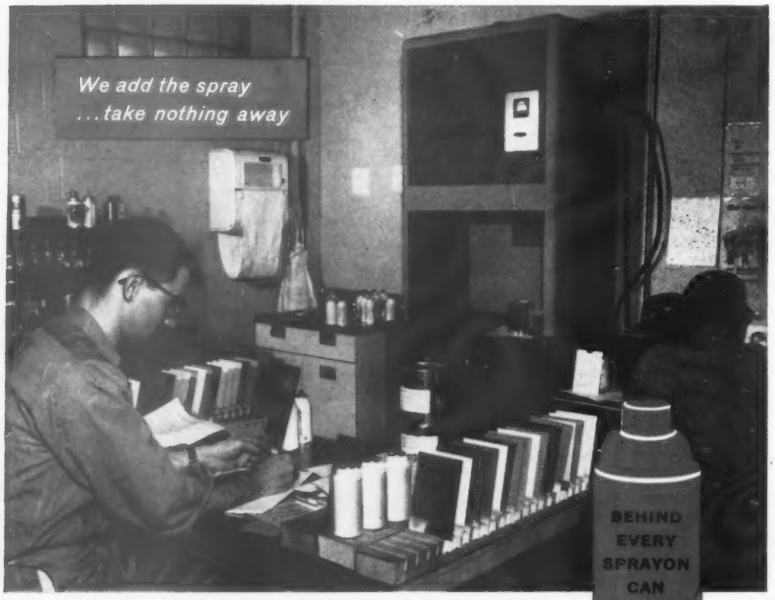
carried out by the Viscostester which permits to measure of viscosity measurements at two different revolutions, by using a frequency generator at five different revolutions. The measured torque is 125 g cm, the widths of the gaps of the attachments are small in order that the measurment can take place by a known rate of shear.

The above discussion shows that sagging, brushability and flow-out are determined by the paint's rheological properties. Surface tension also plays an important part in the flow-out characteristics of paints. In addition pigment particle size, nature of the pigment's surface, presence of electric charge, surface tension between the pigment, solvent and vehicle are some of the factors which affect the rheological properties of a paint system which in turn affect the application properties of the paint in question.

Acknowledgement

This work which was made at the laboratory of Gebr. Haake K. G. in Berlin and Dusseldorf, represents a comprehensive study and survey of the science of Rheology. The following publications were referred to:

1. Uber den Einflub der rheologischen Eigenschaften auf die Ablaufneigung, die Schichtdicke, den Verlauf und die Streicharbeit von Anstrichstoffen.
About the Influence of the Rheological Properties to the Sagging, Film-thickness, Flow-out and Brushability of Paints.
Published by Herbert Bruss, in "Fette, Seifen, Anstrichmittel, 1958, Heft 10, Seite 975-981
2. Uber die Vermeidung der Gardinenbildung und des Ablaufens.
Concerning the prevention of Sagging.
Published by Herbet Bruss in "Farbe und Lack" 1959, Band 65, Seite 77-79
3. Zur Gültigkeit des Fliebgesetzes nach Casson bei Suspensionen der Anstrichmitteltechnik
The Casson Flow Equation and its Validity for Suspensions of Paints.
Published by Werner Heinz in "Materialprufung", 1959, Band 1, Nr. 9, Seite 311-316
4. Zur Charakterisierung der Antiablaufmittel
For Characterization of Anti-Sagging-Materials.
Published by Herbert Bruss in "Farbe und Lack", 1960, Heft 2, Seite 84-87



Self-spray paint troubles stop here

This is part of Sprayon's quality-control laboratory, where six full-time chemists and paint technicians make sure that your aerosol finishes—custom-loaded by Sprayon—never vary in color or performance. Before production begins, even on a routine re-order, prototype cans are made up in the laboratory and given an accelerated aging test equal to a year of shelf life. Test panels are then sprayed and the film is analyzed by precision instruments. Gloss and other characteristics are checked. Color is double-checked under a MacBeth light, the accepted standard of the paint industry. The spray pattern and the mechanical efficiency of the container are checked. All test data, materials and samples are dated, coded and filed for a year for later reference. Sprayon quality control is one reason why Sprayon has handled the greatest possible variety of contract-loading assignments for many of the nation's largest manufacturers—year after year after year. Get the full Sprayon story today.

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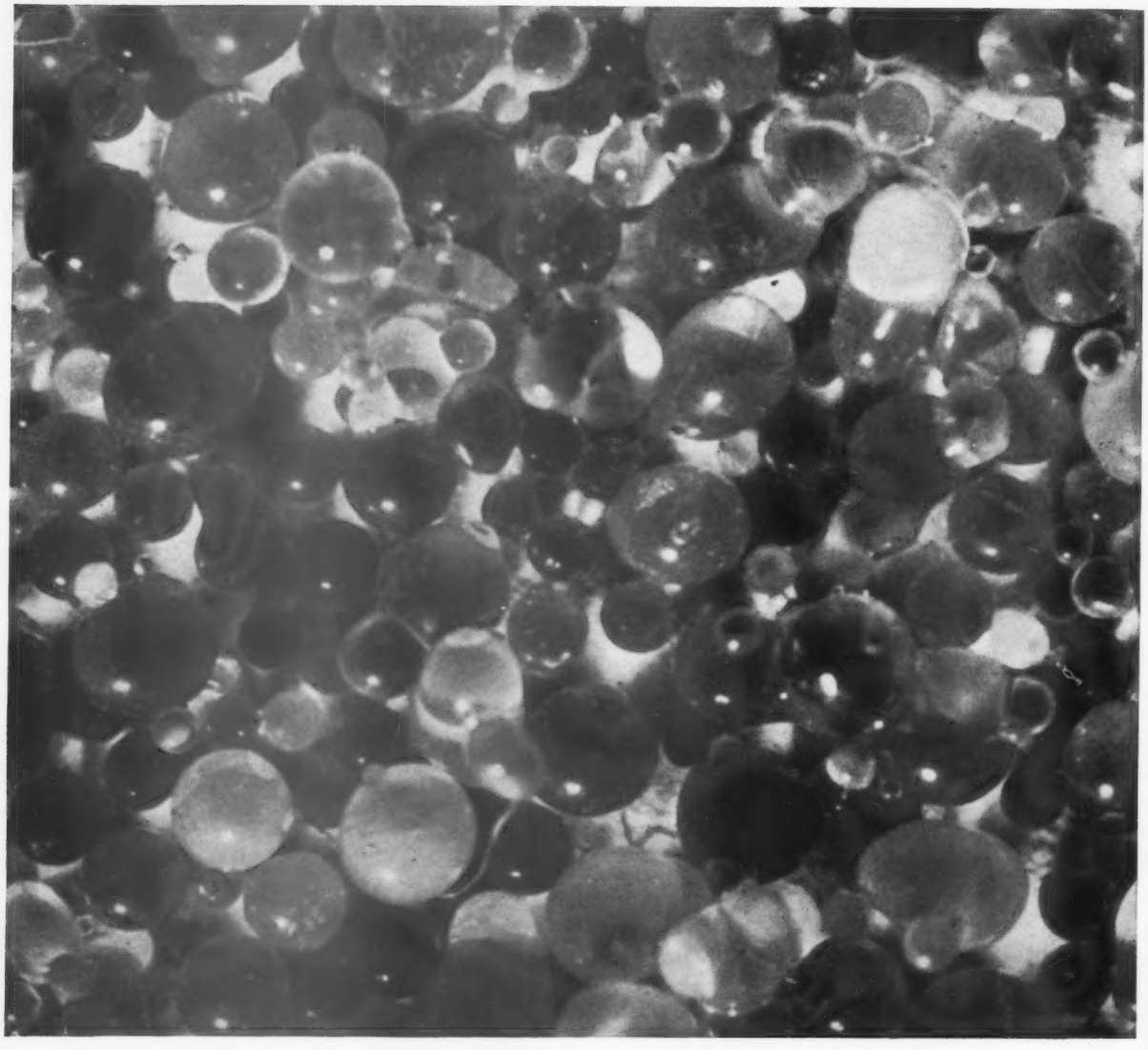
AEROSOL COATINGS

PACKAGING

FORMULATION

PRODUCTION

Aerosol can is used to paint mural at the Cleveland Museum of Natural History. Mural is made of translucent fiberglass panels. See page 96.



What are glass beads doing in the traffic paint picture?

Glass beads—which may derive greater reflecting power from the higher refractive index imparted to the glass by TITANOX®-TG, the non-pigmentary grade of TiO_2—are the "frosting" that give greater reflectivity and visibility to traffic paints. But this is only half the story.

TITANOX-RCHT is the titanium (rutile)-calcium pigment that gives the traffic paint film high whiteness, brightness and hiding power at low cost per gallon. When used in combination with suitable vehicles, and often with supplementary extender, TITANOX-RCHT helps promote the durability that keeps the paint on the road.

Specifications that call for "pure" titanium dioxide are readily met by the TITANOX "pure" pigments in the TITANOX-A and TITANOX-RA lines. For all other types of paint, one or more TITANOX pigments fit the most exacting requirements of paint production programs. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; offices and warehouses in principal cities. In Canada: Canadian Titanium Pigments Ltd., Montreal.

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SUBSIDIARY OF NATIONAL LEAD COMPANY

TITANOX

8225-A

LABELING

AEROSOL PAINT PRODUCTS

By John J. Sciarra*

Part II-This concluding installment deals with the makeup of the label, with particular emphasis on the labeling of aerosol paint products.

BEFORE writing a label, one should gather as much information as possible dealing with the nature of the product. A manufacturer may obtain comments from the Food and Drug Administration on his own proposed labels by writing to the Food and Drug Administration and submitting full information about the identity and proportion of each ingredient used in manufacturing the product, and relevant information such as toxicity data, skin effects data, flash point, and results of practical experience with the product, including reports of any complaints of injury. However, the Food and Drug Administration does not conduct toxicity studies for the purpose of advising manufacturers whether the proposed labels are satisfactory; responsibility for accumulating whatever information is needed for deciding whether a label complies with the law rests with the manufacturer.

Preparation of the Label

In gathering all possible information on a product several means are available to the manufacturer. If the product is one that has been used for many years, a systematic search of the available literature will most likely reveal toxicity data, as well as information as to the physical and chemical properties of the substances. Where the item is relatively new or where toxicity date is not available, the manufacturer may make use of private laboratories in order to determine the toxicity of the product. The toxicity and hazards involved in mixtures of substances would also have to be determined. Depending upon the information obtained as to toxicity, flammability, and other hazards, it can be determined if the product comes under the provisions of the "Federal Hazardous Substances Labeling Act."

Once it has been determined that the product comes under this Act, then it is necessary to determine:

1 The nature of the hazard involved
2 Precautionary Measures which may be necessary
3 First-Aid instructions in case of ingestion, contact, or other exposure.
4 Handling and storage instructions.

To comply with the regulations, the required information should appear on the main panel of the label within the borders of a rectangle in certain size type and style as given in "How to Comply with the Federal Hazardous Substances Labeling Act". It will suffice to say that the lettering must be conspicuous and easy to read. The color of the type used for this required information must be in strong contrast to the background. The required information must be in the English language.

For substances that are extremely flammable, corrosive, or highly toxic, the signal word "DANGER" must appear, and for those substances which are highly toxic, the additional word "POISON" and the skull and crossbones. The signal word "WARNING" or "CAUTION" is used for all other hazardous substances.

The type of hazard involved must be stated. Many products involve more than one hazard, in which case appropriate statements of each significant type must be included on the label, with the most serious hazard stated first. For aerosol or pressurized products, the additional hazard which is present is the danger of the container bursting due to a buildup of pressure. The statement to be included would be:

"Contents Under Pressure. Puncturing, or exposure to prolonged sunlight or other source of heat may cause bursting."

Other statements which may be applicable are as follows:

May be Fatal if Swallowed, Extremely Flammable, Causes Burns, Vapor Harmful, etc.

The statement of precautionary measures is intended to supple-

*Associate Professor of Pharmaceutical Chemistry, St. John's University, College of Pharmacy, Jamaica 32, New York.

ment the statement of hazards and indicates measures of avoiding injury or damage from hazards. For pressurized products:

"Keep away from Heat or Open Flame"

"Do not puncture, expose to prolonged sun light or other source of heat, or throw into fire or incinerator" are applicable.

Other statements include:

"Avoid Breathing Dust or Vapor"

"Do Not Take Internally"

Competent medical advice should be sought in preparing first-aid instruction. While all labeling is designed to prevent injury or damage, accidents, incorrect use, and careless handling indicate the need for adequate first-aid instruction especially in cases where immediate treatment is highly desirable.

The final point to be covered on the label concerns handling and storage instructions designed to prevent injury or damage to the user due to incorrect storage. For pressurized containers the following would be adequate:

"Do Not Store in Sunlight or other Sources of Heat."

"Exposure to temperatures above 120°F may cause bursting."

Other statements may include the following:

"Keep Away From Heat and Open Flame"

"Keep Container Closed"

"Do Not Allow Water to Get into Container"

Now that the basic requirements of the law have been covered and enough information has been obtained, the label can easily be composed.

The examples given in Table I indicate the necessary information exclusive of brand name of product, name and address of manufacturer, and other information required by other Federal, State, and Local laws.

In addition, an aerosol paint product would contain the following:

WARNING

Contents under pressure
Do not puncture
Exposure to prolonged sunlight or other source of heat may cause bursting
Do not throw into fire or incinerator
Do not let children handle.

Since the paint product contains solvents which may be harmful if inhaled, an additional statement to the effect of: "DO NOT inhale vapor while spraying," is necessary.

Table I

DANGER — POISON

Contains carbon tetrachloride
May be fatal if swallowed or inhaled
Use only with adequate ventilation
Avoid prolonged or repeated inhalation or skin contact
Wash hands after use
Emergency Treatment
If swallowed induce vomiting
If inhaled remove to fresh air
Call Physician immediately
Store in cool, well ventilated place
Keep out of the reach of children

A Non-Aerosol House Paint May Contain the Following:

WARNING

Contains lead, selenium, and mercury
Harmful if eaten
Flammable
Keep from heat, sparks, and open flame
Do not apply on interior surfaces of a dwelling, or a place used for care of children, or on window sills, toys, cribs, and other furniture which may be chewed by children.
Avoid breathing vapor, spray, mist, or dust if sanding
Avoid prolonged contact with skin
Wash thoroughly after handling and before eating or smoking
Use with adequate ventilation
Do not take internally
Keep container closed when not in use
Keep out of reach of children

Labels currently used for aerosol paint products carry the necessary information in a variety of ways, but they all must comply with the Federal Hazardous Substance Labeling Act.

In conclusion it should be pointed out writing a good label is in the best interests of the manufacturer.

Through proper labeling, one can reduce significantly the number of injuries traced to use of certain products. This would also reduce the number of civil suits brought against manufacturers by users who have been injured by the product.

Since aerosol products are sprayed in the form of a fine mist or wet spray, the user should be cautioned as to the danger of inhaling some of the finely subdivided particles of active ingredients and solvents. For the most part, aerosol paint products are formulated to dispense as a wet spray containing particles of relatively large size (in the order of about 50 microns). However, a certain percentage of particles much smaller than 50 microns are produced and escape into the surrounding atmosphere. These particles when inhaled over a long period of time, can result in certain toxic or allergic reactions. They are also small enough to be inhaled and absorbed into the system with possible reactions. It is for this purpose that paint products should be sprayed in well ventilated rooms. While some of the solvents used may present a hazard, no hazard is presented by the presence of the propellant (generally a fluorocarbon). The propellants are relatively non-toxic and can be safely used.

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ALKYL ESTER OF LAC ACIDS

Specially treated and processed for use with nitro-cellulose, ethyl cellulose, maleics, phenolics and other film-forming materials.

As countless formulators have already discovered, Mantrose's ES-45 Shellac Ester improves the gloss, flexibility, adhesion, leveling and ultraviolet light resistance of lacquers. And it's stable . . . highly tolerant to hydrocarbons, ketones and ester solvents.

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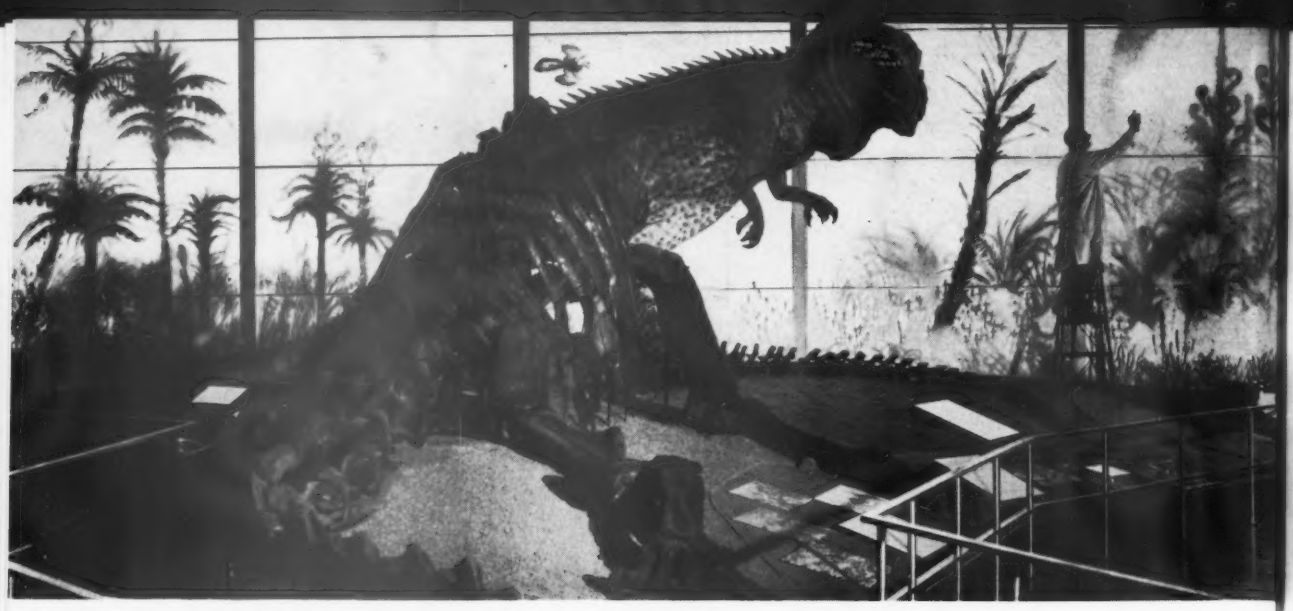
I am interested in using ES-45 Shellac Ester for_____
Please send me: ☐ Working sample ☐ Product literature

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____



Hall of Nature Mural Painted by Aerosol Cans

PAINTED entirely with self-spraying aerosol cans on translucent fiberglass panels, a new kind of mural dominates the "Hall of Nature" in a new wing of The Cleveland Museum of Natural History, Cleveland, Ohio. Measuring 16 by 45 feet, the giant painting is the work of William E. Scheele, Director of the museum, who is also a well-known fine artist and naturalist-illustrator.

The mural represents a swampy landscape of 120 million years ago and serves as a dramatic backdrop for the museum's two large dinosaurs—a replica of a standing Ceratosaurus and the museum's famous Haplocanthosaurus, whose 70-foot skeleton reclines on a simulated river sandbar. The translucent painting is lighted by natural daylight from a great window immediately behind it and can be lighted at night by floodlights outside the building.

The work was painted in place, using an assortment of regular aerosol lacquers and enamels supplied by Sprayon Products, Inc., Cleveland, Ohio.

This is believed to be the first time a mural has been done exclusively with aerosols, although other mural artists have used them in addition to their brushes and palette knives. The self-spraying cans are particularly valuable in doing shrubs, trees, buildings and sky areas.

Mr. Scheele achieved an interesting effect of depth and distance in his painting. Objects in the foreground are seen in sharp focus and were painted with stencils cut from kraft paper. Plants and giant ferns in the distance were done with the aerosol spray alone, held farther and farther from the work, and seem to blur and vanish in the mists of the swamp.

The artist suggests that the new technique is useful not only in the field of mural art but should have interesting applications in building decoration, theater stage sets, handicraft projects and commercial display work.

The panels used in the museum painting are Filon, a brand of nylon-reinforced fiberglass. They are white in color with an embossed, textured surface.

Aerosol Developments

Atlas Discusses Role Of Private Label Mfrs.

Douglas Atlas, Vice President of G. Barr & Co., nation's largest producer of private label aerosols, addressed the graduate school of business administration at Northwestern University recently on the contributions and future role of the private label manufacturer in the rapidly expanding aerosol industry.

Speaking at a luncheon meeting in Abbott Hall, Chicago, Mr. Atlas said:

"It is a matter of simple economics. If all other things being equal, the private brand manufacturer can make a product as cheaply as the marketer can make it for himself, there is no reason for the marketer to set up a manufacturing operation. If then, one proposes to remain successful, as a private brand manufacturer, it behooves him to know his technology superlatively well; to obtain the best degree of efficiency from his production equipment and personnel; to avoid obsolescence like a plague and to be able to amortize the costs of doing these things over a large production volume. In this way, he can offer his customers the economies of his large volume efficiency and produce their goods cheaper than they could themselves. They in effect rent his highly efficient plant and personnel for a few hours, a day, a week or a month. Collectively, his customers become more efficient than they could be individually."

He noted that the past growth of the aerosol industry was paced by the private label manufacturer.

He said: "After all, two things make markets—products and marketers. The contract manufacturer in his thirst for business to keep his expensive production lines in operation strained every inch of initiative and inventiveness in an effort to develop new aerosol products as a part of an aggressive program to

Douglas Atlas

bring new marketers into the industry.

"It is my feeling that they are in the aggregate more responsible for the growth of the aerosol industry than any other single factor."

Mr. Atlas stressed that the private label manufacturer to maintain his future share of the market must be creative. "If through a highly specialized technical staff, he can develop new products—simply being inventive—the product and services of manufacturing it can be sold as a complete package," he said.

Stating that the future of private brand manufacturer will be as bright as the market itself, he said the industry has reached a new maturity.

"Of the some 75 firms in the field, perhaps 8 do the bulk of the work. And these are firms who during the past 14 years have predicated their business on sound premises. They have specialized in this field, have added substantial laboratory facilities and quality control staffs, have invested heavily in a broad range of aerosol production equipment, and keep their plants and their technical staffs up to the minute," he concluded.

Crimping Collets Deliver Over Million Crimps

A new combination, line tested plunger and crimping tool for aerosol cans is now being introduced to aerosol product packagers by Aerosol Products, a division of Royal Products, Plainview, L. I., N. Y., manufacturers of high quality industrial tools. A well-known user reports crimping of over 500,000 cans without sign of wear on jaws or plunger, and throughout the runs "held well within crimping tolerance." It is also reported that there were no hang-ups or pickups, a common failing heretofore in aerosol can sealing, and that continuous operation without loss in down-time increased production and time and labor savings substantially.

The combination crimper assembly, Model No. APCR1, is designed for standard 1" can valves and permits greater area of contact for firmer, more secure sealing. When the plunger drops, it expands six resilient, precision tooled segments for the crimping contact. When the plunger withdraws, the segments snap back into position for instant positive release of the can, ready for the next crimp.

DeMert & Dougherty Brush Disperses Any Liquid

New make-your-own aerosol unit, which will spray any liquid or powder—including high viscosity paints—is available from DeMert & Dougherty, Inc., Chicago, Ill., it was announced.

Called "Aero/Match Spray Brush," the unit will spray any cleaner, paint, ink, etc. The product is put in a glass container, linked to a power unit by a plastic tube, and sprayed.

Big convenience feature of Spray Brush is its use for jobs where a small amount of lacquer or enamel is desired. Spray Brush makes practical the use of multi-color splatter finishes, exact spray matching of brushed-on colors, and use of colors not available in aerosol. The unit offers even the inexperienced painter a larger margin of safety against ruinous paint runs.

One can of Spray Brush propellant will disperse the same amount of paints as 2.3, 16 oz. cans of aerosol paint, while giving approximately 22 per cent more coverage than 2.8, 16 oz. cans. Most brushing enamels need only 10 per cent thinner for efficient disposal.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

Presidents, Vice Presidents and Sales Managers of the seven companies of Vulcan-Associated Container Companies, Inc. met at the Executive Office in Birmingham, Ala. for a two-day Managerial Conference. Plans were discussed and projected for a stepped-up program of sales-service to container users throughout the nation and a personalized cooperation by each plant with its customers and prospective container users. New products, new sales and promotional programs and a new concept of better plant co-ordination were presented. Present at the meeting were Gordon D. Zuck, President; Fred A. Kusta, Executive Vice President; David W. Lynch, General Sales Manager and other members of the firm.

Lowell Thomas and I. G. Davis, Jr., (left), President of Mary Carter Paint Co. national paint manufacturers and retailers, present a $50,000 check to help finance the first U. S. Government quality standards for customers of the $2 billion U. S. paint industry. Russell L. Weiss (right) accepts the check to be held in escrow by the Industrial Bank of Commerce of N. Y., pending completion of the half-million dollar fund needed to set up the Department of Commerce-approved quality grades to protect paint consumers. Mr. Thomas is a director of the Mary Carter firm, which made the call to its industry to offer paint buyers an official guide by means of quality grades on can labels, adds and invoices.

National Lead Constructs New Research Center

National Lead Co. began construction of a new multimillion dollar research center in East Windsor Township, near Hightstown, N. J.

Located on a 250-acre site adjacent to the New Jersey Turnpike, the research center will comprise separate units designed to provide specialized facilities for research and development work for the company's major divisions.

Construction of the first unit of the firm's research center is scheduled for completion in the summer of 1962. The building will contain 87,000 square feet of laboratory, office and service space. There are four wings which will be devoted to research and development in the fields of non-ferrous metals, paints and pigments, lead chemicals, plastics and resins. The building will also include a cafeteria and a library, as well as service and storage facilities. The present staff of 150 scientists and technicians at the company's Brooklyn Research Laboratories will be transferred to the new center.

American Tung Oil Assn. To Meet September 26

The 27th Annual Tung Industry Convention will be held September 26-28 at the Edgewater Gulf Hotel, Edgewater Park, Miss.

The convention, which is a combined meeting of the American Tung Oil Assn., The National Tung Oil Marketing Cooperative and the Pan American Tung Research and Development League, will include discussions on all phases of the industry and reports on activities of the organizations during the past year.

One of the outstanding features of the convention will be a research panel made up of several prominent research men who have been conducting developmental work on tung oil. The panel discussions will include reports on work by the David Litter Laboratories in New York City on the use of tung oil as a modifier for exterior latex paints and the new water soluble tung oil primer developed by the Pan American League and now under test by several commercial companies.

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

The newly-dedicated Truman Library master-mural by Thomas Hart Benton, "Independence and the Opening of the West," is executed in acrylic polymer paints, modern synthetic successor to the classical egg tempera of many generations of muralists.

Famous Valspar "boiling water test" trademark was graphically illustrated by William[Cardinal, Salesman, to F. J. Baudhuin, Valspar Executive Vice President, at recent Valspar sales meeting. Originated in 1914, the test was devised to introduce dramatically the first varnish ever produced that would not turn white from effects of moisture and heat.

Armour Opens Lab

New 30,000 square foot laboratory and pilot plant devoted to research in chemicals made from animal and vegetable fats and oils has been opened by Armour Industrial Chemical Company.

Expansion of research activities to provide industry with newer and more versatile chemicals made it necessary to build the new laboratory, according to the firm.

Devoe & Raynolds Enters Reciprocal Sales Agreement

Two of the world's oldest and largest paint manufacturers—one American, the other Dutch—announced a global sales and service arrangement to meet the need of ship operators for technical services and marine finishes of uniform quality in various ports of call.

The unique reciprocal service and sales arrangement was negotiated by Devoe & Raynolds Co., Inc. and Pieter Schoen & Son, whose internationally known "Lily Brand" dates back to 1722. Under the arrangement, the American and Dutch companies will provide reciprocal technical services for each other's customers in their respective market areas throughout the world, and provide products of uniformly consistent quality. Special controls have been established by each to insure that Devoe and Lily Brand Marine paints can be used interchangeably with full confidence that they have been formulated to exacting specifications.

Burgess Appoints Kraft

Burgess Pigment Co., Sandersville, Ga., has announced it has appointed Kraft Chemical Co. of Chicago as its midwest sales distributor. Kraft will cover the sale of hydrous and anhydrous calcined clays in the Chicago area, northern Indiana, the far Eastern portion of Iowa and the states of Wisconsin and Minnesota.

Name Change

Food Machinery and Chemical Corp. has changed its name to *FMC Corp.* A management proposal to make the name change received stockholder approval at the company's annual meeting.

FMC Chairman Paul L. Davies said that "we have always been a leading supplier of machinery and equipment for the food industry, but in relation to our growth in basic chemicals and other fields, 'food machinery' sales, although larger than ever, represent less than one-fourth of our total business volume. Consequently, the term 'food machinery,' when used as the chief descriptive element in our corporate name, directly contradicts the full scope of our total widespread activities."

NEWS

NEWS OF COMPANIES, ASSOCIATIONS
TECHNICAL GROUPS
ITEMS OF GENERAL INTEREST

Alfred W. Low

Low Elected 75th President Of Paint Association

At its Annual Dinner Meeting, the New York Paint, Varnish and Lacquer Assn. membership elected Alfred W. Low its 75th President to serve for the organization's 1961-1962 fiscal year.

Mr. Low is Divisional Vice-President of Benjamin Moore & Co., one of the largest paint manufacturers in the world.

Elected with Mr. Low were James W. Wilson, Vice-President of Brooklyn Paint and Varnish Co., Inc., who will serve as the Association's Vice-President; William J. Houston, Vice-President Marketing, Nuodex Products Co., Inc., elected Secretary, and Meredith C. Price of the Sherwin-Williams Co. who was re-elected Treasurer.

Gardner Forms Gardner

Charles Gardner announces the formation of Gardner Chemicals, Inc. to engage in the sales of chemicals as a manufacturers representative to the paint, printing ink, plastics and rubber industries. Office location—295 Madison Ave., New York 17, N. Y.

Mr. Gardner was formerly Manager of the Paint Chemical Division of the Witco Chemical Co. He has had over 20 years of technical and sales experience and lectured before many scientific societies.

Polychrome Acquires Cellofilm

Polychrome Corp. announced the acquisition of Cellofilm Industries, Inc., Wood-Ridge, N. J., as a wholly-owned subsidiary.

The new company will be known as Cellofilm Corp. All present personnel will be retained; Stanley Eysmann will continue in the position of President.

Cellofilm Corp. in continuous operation since 1916, is one of the nation's largest consumers and processors of nitrocellulose. The company specializes in the chemical fabrication for bulk users of nitrocellulose compounds in such industries as the lacquer graphic arts, industrial finishes, adhesives and coated textiles.

Paint experts and officials of the Painting and Decorating Contractors Assn test the strength of a film formed from an acrylic emulsion, at the fourth session of the special courses sponsored by the Association and the local Board of Education. Left to right: Joseph McManus, Asst. to Exec. Sec., Los Angeles County Chapter of the P.D.C.A.; Frank Johnson, Los Angeles Rep., Dow Chemical Co.; Homer G. Marshall, Supv., Painter and Maintenance Sales, Pittsburgh Plate Glass Co.; Gerould Allyn, Technical Asst. on Acrylic Materials, Rohm & Haas Co.; and John Harris, Exec. Sec., Los Angeles County Chapter, P.D.C.A.

Constituent Society Meetings

Baltimore, 2nd Friday, Marty's Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Dick Perfidio's Wishing Well.
Dayton — Nov., Feb., April, Hotel Gibbons.
Columbus — Jan., June, Sept., Everglades.

Cleveland, 3rd Friday, Cleveland Engineering & Scientific Center.

Dallas, 1st Thursday after 2nd Tuesday, Lucas B & B.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Monday before 3rd Wednesday, Sabella's Restaurant, San Francisco.

Houston, Monday prior to 2nd Tuesday, Rams Club.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Montebello Country Club.

Louisville, 3rd Wednesday, Sheraton Hotel.

Montreal, 1st Wednesday, Qpeen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, 3rd Thursday, Washington Athletic Club, Seattle, Wash.

Philadelphia, 2nd Thursday, Philadelphia Rifle Club.

Piedmont, 3rd Wednesday, Rainbow Supper Club, High Point, N. C.

Pittsburgh, 1st Monday, Gateway Plaza, Bldg. 2.

Rocky Mountain, 2nd Monday, Republican Club, Denver, Colo.

St. Louis, 3rd Tuesday, Rugger's.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Oak Room, Union Station.

Western New York, 1st Monday, 40-8 Club, Buffalo.

PERSONNEL CHANGES

SCHENECTADY VARNISH

Philip H. Groggins, Jr. has been named Sales Manager-Resins. All marketing of resins of a non-electrical nature will be directed by Mr. Groggins and his staff.

George Brannick has been named to the new position of Manager, Technical Service-Resins. He will direct the technical service program staff on all of the resins of a non-electrical nature.

John S. Horn has been appointed to succeed Mr. Groggins in the Chicago area. Mr. Horn will be responsible for technical sales and service for the complete line of industrial resins to the paint, foundry, paper, adhesive, printing ink, brake lining and rubber industries in the greater Chicago area.

ARIZONA CHEMICAL

Dr. L. Patrick Moore has been elected President. Dr. Moore succeeds Jerrold H. Ruskin, who has been named General Manager of Cyanamid's Industrial Chemicals Division.

L. P. Moore

Carlo Giraudi

WITCO

Dr. Carlo Giraudi has been appointed Vice President in charge of research, development and engineering.

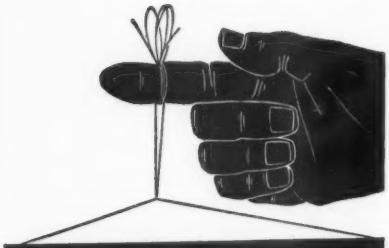
In his new post, Dr. Giraudi's responsibilities extend to all the firm's divisions and subsidiaries.

EMERY INDUSTRIES

Kenneth H. Pettengill has been named Manager of the Process Research Section; **Herbert M. Kay** has been appointed a Product Development Representative for the Development-Service Dept.

UNITED CARBON

Frank O. Holmes has been promoted to Manager of Technical Service. This new position brings field and laboratory technical service under the management of Mr. Holmes.



CALENDAR

July 17-21. Gordon Research Conferences, Organic Coatings, Kimball Union Academy, Meriden, N. H.

Aug. 28-29. 41st Annual Convention of American Soybean Assn., Claypool Hotel, Indianapolis, Ind.

Sept. 3-8. 140th National Meeting, American Chemical Society, Chicago, Ill.

Sept. 11-15. Fall Instrument-Automation Conference and Exhibit and 16th Annual Meeting, Instrument Society of America, Memorial Sports Arena, Los Angeles, Calif.

Sept. 17-20. 49th Annual Convention of Canadian Paint, Varnish & Lacquer Assn., Park Plaza Hotel, Toronto, Canada.

Oct. 18-20. 23rd Annual National Packaging Forum of the Packaging Institute, Biltmore Hotel, New York City.

Oct. 30-Nov. 1. Seventy-fourth Annual Meeting of the National Paint, Varnish and Lacquer Assn. Statler-Hilton Hotel, Washington, D. C.

Oct. 30-Nov. 1. Fall Meeting of the American Oil Chemists Society, Pick-Congress Hotel, Chicago, Ill.

Oct. 30-Nov. 1. 4th Annual Meeting and Conference of the Canadian Mfrs. Specialties Assn., Royal York Hotel, Toronto, Canada.

Nov. 2-4. Annual Convention of the Federation of Societies for Paint Technology. The Shoreham and Sheraton-Park Hotels, Washington, D. C.

November 26-28. Fourteenth Annual Convention and Trade Show of the Retail Paint & Wallpaper Distributors of America at Cobo Hall, Detroit, Mich.

December 4-6. Chemical Specialties Mfrs. Assn., 48th Annual Meeting, New York City.

ALLIED CHEMICAL

Appointment of **Dr. Elwood F. Booth, Jr.,** as Director of Research for Solvay Process Division has been announced.

Dr. Booth succeeds Dr. Herbert C. Wohlers, who has been transferred to the firm's National Aniline Division as Director of Research and Development.

DESOTO

Richard J. Baruth has been appointed Regional Sales Manager, Central Region.

Mr. Baruth will direct the paint and resin sales activities in the fifteen midwestern states.

R. J. Baruth

M. A. Weppner

CENTRAL SOLVENTS

M. A. Weppner has been elected to the presidency, replacing **H. G. Sampson**, who announced his retirement from active direction of the firm.

The names of the following were elected to the Board of Directors: H. G. Sampson, D. G. Nethercott, M. A. Weppner, R. T. Hough, J. W. Sampson, J. J. Van de Ryte, K. L. Simpson, R. C. Nicholls, K. F. Giloth, A. W. Vallentyne and H. C. Anderson.

CARBOLA CHEMICAL

Milton C. Koenig has been appointed Industrial Sales Representative. Mr. Koenig will be responsible for sales of Micro Velva and Asbestol extenders to paint manufacturers in New England, New York, New Jersey, eastern Pennsylvania, Maryland, and Washington, D. C.

GENERAL ANILINE

Emil A. Wich has been appointed to the position of Manager-Technical Service and Development at Collway Pigments Div. He will be responsible for technical service, as well as sales and product development of present product lines.

CARGILL

Dr. A. Richard Baldwin, Research Director, has been appointed Assistant Vice President of the firm.

HERCULES POWDER

R. F. Schlaanstine has been appointed to the newly created post of Synthetics Department Operating Manager; **E. St. P. Bellinger** has been named Department's Director of Operations.

COMMERCIAL SOLVENTS

William George Swalwell has joined the Industrial Chemicals Department. Mr. Swalwell will operate out of the company's Agnew, Calif. office.

W. G. Swalwell

R. L. Rooney

BRADLEY & VROOMAN

Robert L. Rooney has joined the firm as Technical Sales and Service Representative covering Eastern Ohio, Western New York, Western Pennsylvania and West Virginia.

He will call on users of industrial coatings, specialty finishes and fluid plastics (plastisols, organosols, etc.). These products represent the Chicago firm's principal lines.

ADVANCE SOLVENTS

George A. Thacker, Jr., has been appointed Assistant to the Sales Manager of the Plastics Division.

G. A. Thacker, Jr.,

L. L. Redshaw

UBS CHEMICAL

Lincoln L. Redshaw has been appointed as President. Mr. Redshaw succeeds Paul W. Atwood, who retired after 34 years in advertising, management counseling and corporate management, eight years as head of the firm. He will continue his association with the company on a consulting basis.

HEYDEN NEWPORT

Theodore H. Risch has been appointed General Sales Manager of the Newport Industries Division. Mr. Risch will be in direct charge of all marketing activities of the Newport Industries division.

PITTSBURGH CHEMICAL

D. L. McCuen has been appointed Product Manager for the Industrial Chemicals Division. His responsibilities involve the planning and marketing of the firm's complete line of plasticizers.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Ave. of Americas, N.Y. 1, N.Y.

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15 H. P. geared agitator motors; Vertical; Explosion proof. Speed 68 RPM; Designed for 4,000 gal. tanks New. Davenport, Box 18152, Louisville 18, Ky. Ju 2-2661.

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HYDRITE PX	High brightness, fine particle size, high water and oil demand.	Interior emulsions, primer systems, emulsion floor paints.	High gloss, good scrubability, hiding power and suspension. Excellent rheological properties.
HYDRITE R	Small particle size, free of coarse particles, medium oil demand.	Interior emulsions, primer systems.	Good color, stain removal, hiding power and suspension, yet economical.
HYDRITE 121	Intermediate particle size, intermediate water and oil demand.	Interior emulsions, primer systems, exterior emulsions.	Good stain removal, hiding power and suspension. Controlled fast chalking rate. Very economical.
HYDRITE FLAT D	Large particle size, lower water and oil demand.	Interior emulsions, primer systems, exterior emulsions.	Controlled low gloss with good enamel hold-out, suspension and hiding power. Low chalking rate.
HYDRITE MP	Largest particle size available, lowest water and oil demand.	Flatting agent for oleoresinous and emulsion paints, exterior paints.	Highest flatting efficiency, low burnishing, improves color uniformity and lapping characteristics, minimum chalking.
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